

DTIC FILE COPY

AD-A197 736

MOUNTAIN INFANTRY - IS THERE A NEED?

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

JON D. GREER, MAJ, USA
B.A., Furman University, 1977

Fort Leavenworth, Kansas
1988

DTIC
ELECTE
SEP 02 1988
S H D

"Approved for public release; distribution unlimited."

88-3206

88 9 2 021

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Command and General Staff College		6b. OFFICE SYMBOL (If applicable) ATZL-SWD-GD		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) Attn: ATZL-SWD-GD Fort Leavenworth, Kansas 66027-6900			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) Mountain Infantry - Is There A Need?					
12. PERSONAL AUTHOR(S) Major Jon D. Greer					
13a. TYPE OF REPORT Master's Thesis		13b. TIME COVERED FROM 8-1987 TO 6-1988		14. DATE OF REPORT (Year, Month, Day) 1988 June 3	
15. PAGE COUNT 117					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Mountain Infantry, Mountain Warfare, Allied Mountain Infantry U.S. Light Infantry Battalion, 3rd Battalion 172d Infantry (Mountain), 10th Mountain Division		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) (See reverse side)					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL			22b. TELEPHONE (Include Area Code)		22c. OFFICE SYMBOL

19. ABSTRACT (Continued)

This study uses the past as a basis for establishing the need for mountain infantry units by comparing the combat operations of the 88th Infantry Division and the 10th Mountain Division during World War II on the Italian peninsula. An analysis of current world wide mountainous deployment areas reinforces the need for a credible mountain unit in the 1990s. The organization, mission, and training philosophy of the French, Italian and German mountain infantry units is discussed which leads into a comparison of the German mountain unit with the United States light infantry battalion and the United States Army National Guard 3rd Battalion, 172nd Infantry, (Mountain).

The light infantry battalion and the 3-172d Infantry (Mountain) are the only units tasked in the United States Army force structure to fight a conventional war in the mountains. Both unit's mission, organization, capabilities, limitations and training are contrasted thus showing the United States Army's current capability to fight in the mountains.

The study conclusively demonstrates that the United States Army must organize and train a mountain infantry force which can meet the challenges of mountain operations and counter the possible threat in the numerous mountainous regions throughout the world.

MOUNTAIN INFANTRY - IS THERE A NEED?

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

JON D. GREER, MAJ, USA
B.A., Furman University, 1977

Fort Leavenworth, Kansas
1988

"Approved for public release; distribution unlimited."

MASTER OF MILITARY ART AND SCIENCE


THESIS APPROVAL PAGE

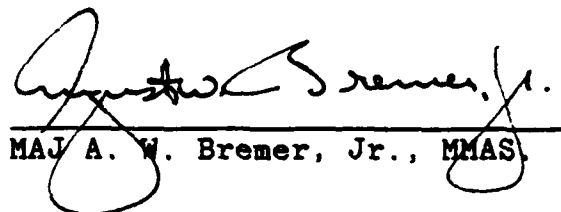
Name of Candidate: Jon D. Greer, MAJ. USA

Title of Thesis: MOUNTAIN INFANTRY - IS THERE A NEED?

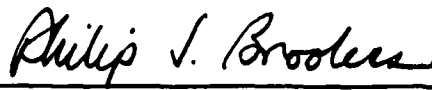
Approved by:


_____, Thesis Committee Chairman
LTC D. P. Wood, M.S.


_____, Member, Graduate Faculty
DR. C. R. Gabel, Ph.D.


_____, Member, Graduate Faculty
MAJ A. W. Bremer, Jr., MMAS.

Accepted this 3rd day of June 1988 by:


_____, Director, Graduate Degree
Programs
Philip J. Brookes, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

MOUNTAIN INFANTRY - IS THERE A NEED?: A historical and present day analysis on the necessity of mountain infantry units in the force structure of the United States Army, by Major Jon D. Greer, USA, 117 pages.

This study uses the past as a basis for establishing the need for mountain infantry units by comparing the combat operations of the 88th Infantry Division and the 10th Mountain Division during World War II on the Italian peninsula. An analysis of current world wide mountainous deployment areas reinforces the need for a credible mountain unit in the 1990s. The organization, mission, and training philosophy of the French, Italian and German mountain infantry units is discussed which leads into a comparison of the German mountain unit with the United States light infantry battalion and the United States Army National Guard 3rd Battalion, 172nd Infantry, (Mountain).

The light infantry battalion and the 3-172d Infantry (Mountain) are the only units tasked in the United States Army force structure to fight a conventional war in the mountains. Both units' mission, organization, capabilities, limitations and training are contrasted thus showing the United States Army's current capability to fight in the mountains.

The study conclusively demonstrates that the United States Army must organize and train a mountain infantry force which can meet the challenges of mountain operations and counter the possible threat in the numerous mountainous regions throughout the world.



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

TABLE OF CONTENTS

APPROVAL PAGE	11
ABSTRACT PAGE	111
TABLE OF CONTENTS	iv
INTRODUCTION	1
ESTABLISHING THE NEED	6
The Blue Devils of the 88th Infantry	11
The 10th Mountain Division	22
Current Deployment Areas	37
MODERN RESPONSES - COMPARE AND CONTRAST	47
The Gebirgsjagers	53
The United States Army Light Infantry Division	59
The 3rd Battalion, 172d Infantry (Mountain)	64
Contrast of Personnel and Equipment Items	70
Contrast Using the Dynamics of Combat Power	72
CONCLUSION	84
Personnel/Organization	85
Training/Tactics	87
Logistics/Sustainment	92
Alternate Methods of Employment	94
Areas for Further Research	96
Appendix A - Map of 88th Infantry Division Operations.	97
Appendix B - Map of 10th Mountain Division Operations.	98

Appendix C - Organizational Diagram, 27th French Mountain Division and Italian Alpini Brigade	99
Appendix D - Organizational Diagram, 1st German Mountain Division	100
Appendix E - Organizational Diagram, Light Infantry Division and Light Infantry Battalion ...	101
Appendix F - Organizational Diagram, 3-172d Infantry (Mountain).....	102
ENDNOTES	103
BIBLIOGRAPHY	108

CHAPTER 1

INTRODUCTION

The purpose of this study is to ascertain a need for a mountain infantry unit in the current U.S. Army force structure. The concept of "need" can be defined several ways. This analysis will focus on an historical perspective of combat in the mountains, possible mountainous deployment areas, and identification of current force capabilities -- including a comparison to allied mountain infantry units. The paper will contrast the U.S. and allied units using the dynamics of combat power. The thesis will conclude with an answer based on the analysis of whether the U.S. can fight in a mountain environment and win with its current capabilities.

The study of warfare is replete with conflicts conducted in mountainous terrain. An historical analysis of two United States infantry divisions will demonstrate the difference in using troops trained to fight in the mountains and troops not trained in mountain operations. The two units examined are the 88th Infantry Division and the 10th Mountain Division. Both divisions fought on the Italian peninsula during World War II. Using the same enemy,

environment and time period provides a valid foundation to conduct the analysis. The 10th Mountain Division fought in Italy in 1944-1945 and is the only active duty unit the U.S. trained specifically for mountain operations. The 88th Infantry Division was a draftee division which penetrated the German Gothic Line defenses that stretched across the Italian continent. A comparison of the background of the divisions, their organization, level of training, the results of their combat operations, and lessons learned is made in order to determine if the training and organization made a significant difference in the outcome of the battles.

Using the terrain analysis from the two historical battles as a basis of comparison, the current possible deployment areas for U.S. forces are discussed. Terrain can be as deadly as the enemy force. Leaders must study in detail possible areas of employment since over 42% of the earth's land mass consists of mountainous terrain. Future battles will probably occur in such areas.

Upon completion of the terrain analysis, the forces currently available in the U.S. force structure to accomplish the mountain mission are discussed along with a few allied mountain units. There are two schools of thought on what forces are necessary for mountain operations. One group professes that the U.S. infantry soldier is a versatile fighting man who can and will accomplish the mission in any environment, whether it is mountainous,

jungle, heavily forested, urban or desert terrain. The regular infantry unit only needs a little specialized training, and it would be ready to fight. This group feels that the standard infantry unit, whether it be light, mechanized, air assault or airborne, can adapt and fight effectively in mountainous terrain.

The other school of thought insists that the U.S. must have a technically trained mountain force, ready to deploy as a unit or function as a cadre to teach other units how to operate in the mountains. The reasons for the formation of the 10th Mountain Division in 1943 are the focal point of their argument as are lessons learned in previous battles throughout history.

A comparison is made between German mountain units, United States Army light infantry battalions and the Army National Guard 3-172d Infantry (Mountain) philosophies for employment, missions, organizations, weapon densities, and training. The paper will narrow the focus and contrast the three units using the dynamics of combat power. The dynamics of combat power are maneuver, firepower, protection and leadership. This study will focus on the tactical level of combat power. Troops operating in the mountains have the ability to attack from an unexpected direction, accomplishing tactical surprise.

Maneuver is the ability of a unit to secure and retain positional advantage (FM 100-5). Units in the mountains

will often operate independently and need the necessary organic firepower and protection to fight and win. Each unit's weapon systems and means of massing firepower is contrasted. The unit's ability to protect itself in order to counter the enemy's firepower and maneuver is analyzed. The systems established to care for the welfare of the soldier and the ability to sustain the units are also discussed. Finally, the key ingredient, leadership, is examined in terms of the chain of command, the communication capabilities, and the skills required of a leader to operate in a mountain environment.

The concluding chapter will ascertain if, based on the historical analysis and current deployment areas, there is a need for mountain infantry units. It will review the current capabilities of the U.S. force structure and use the comparison results presented in chapter 2, to determine if the U.S. can adequately meet the requirements of combat in a mountainous environment.

Two assumptions are necessary in order to maintain a narrow focus for this thesis. The first assumption maintains that the 3rd Battalion, 172d Infantry (Mountain) reflects the current U.S. Army's concept for the correct organization of a mountain infantry battalion. This assumption will eliminate the numerous parochial opinions of several different sources nation-wide. Due to the confusion on the employment of light infantry, the second assumption

is that the current capability statement of employment in any terrain includes mountains.

The thesis will highlight additional areas for research and provide an annotated bibliography which reviews useful and non-pertinent sources.

CHAPTER 2

ESTABLISHING THE NEED

This chapter will focus on the Fifth U.S. Army operations in Italy in 1944-1945, providing a broad overview of the area of operations as well as problems encountered by the units fighting in the mountainous terrain. Two divisions will be analyzed in order to compare and contrast units that had mountain training and those that did not. The 88th Infantry Division and the 10th Mountain Division will be discussed with emphasis on their organizational backgrounds, level of training in mountain operations, the results of specific battles, and lessons learned from each engagement. A comparison of the two units will determine if being trained and organized for mountain operations had any affect on their performance. These two divisions were selected because both were assigned to the Fifth Army and operated in similar terrain. They also fought against the Germans within the same general time frame.

The stage must be set by discussing the tactical situation and problems that faced the Allied forces in Italy during World War II. The overall plan in 1944 had the British Eighth Army attacking first on the Adriatic coast and then the U.S. Fifth Army capturing Bologna. The two

armies would linkup and drive north, crossing the Po River, and cut off the last routes of withdrawal of the German forces out of Italy.¹

In 1944-1945, the Fifth Army consisted of two Corps, the IV Corps and the II Corps. The Fifth Army was positioning itself in the Apennines for a spring offensive. The 10th Mountain Division joined the IV Corps in early 1945, while the 88th Infantry Division was assigned to the II Corps. The objective was to cut off and destroy the German forces before they could cross the Po River. The area of operations for the two corps was in the rugged Northern Apennines.

The terrain was an enemy to the Allies and the Germans. The Northern Apennines consist of abrupt and jagged peaks with elevations as high as 5000 feet. The valley floors consisted of cultivated fields of grain and on the lower hills, vineyards. The slopes of the mountains were scrub oak mixed with bare rock with sharp ridges and steep cliffs. Movement of vehicles was nearly impossible off the narrow roads and trails. The towns were located on the valley floors or on the roads in the mountain passes. The roads and valleys turned to mud in the rain.

The weather was another enemy the soldiers faced. During the last part of September 1944, the rains came and the mountain streams swelled and overflowed in a short period of time. Visibility was often reduced to zero with

fog and cloudy conditions. Snow began to fall in the higher elevations in late October and by mid-winter the mountain passes became blocked periodically.² In short, the infantryman's life was miserable.

The Fifth Army chain of command faced a number of challenges. The entire front was limited to small unit operations due to the nature of the terrain. Problems in supply, evacuation and communication occurred that had not hitherto been encountered by the staff. A majority of the streams were fordable by infantrymen, but their support vehicles were constantly stuck or blocked.³

Infantry tactics had to be modified focusing more on small unit actions with limited objectives. Due to the range of observation by the enemy, night operations became a way of life. Scouting and patrolling were principal daily activities, and the use of mortar and artillery fires increased. Overwatch and security techniques were modified. Distance between units was not based on the length of the road but on the ability to react. If the lead unit got into trouble, the reserve or overwatch force could not maneuver quickly off the limited trails and steep slopes. Engineers were normally forward, because there was neither room nor time to bring them forward when needed. The ability of a unit to coordinate its combat support and combat service support swayed the outcome of the battles.⁴

Adjusting fire was an especially difficult technique to learn in the mountains. Minor adjustments could easily bring rounds onto a friendly ridge line. In order for the rounds to clear ridge lines, the mortars had to fire at maximum elevation, which meant they had to be close to the front lines to be effective.⁵

A significant lesson learned by the Fifth Army was that units should avoid the valleys and natural avenues of approach and seize the high ground. Then, they could work down the slopes of the ridges to force the enemy out of his positions. A continuing problem was that, once a peak was secured, the enemy would occupy an adjacent peak providing him the same fields of fire and observation. Terrain analysis was a skill which would cost many lives if not carefully conducted. One of the commanders in the Fifth Army stated: "You have an abnormal situation in the mountains.... You can't scale the peaks and you can't use the valleys which are mined. This means you must work the slopes... you can only learn these special tactics by going in and applying them...."⁶

Supply was one of the major feats of the campaign. The logisticians could get material to the base of the mountains, but the flow of supplies became limited to what a mule and most of the time, a man could carry on his back (Note: men needed both hands to climb). Mules and mule handlers were essential to the supply operations. At times,

food for the mules became more important than some of the supplies needed for combat operations.

The combat leader has his hardest challenge in the mountains. Strong, aggressive leadership has to counter all of the major problems of terrain, weather, logistics and tactics. The leaders of the Fifth Army never had experienced more brutal operations than fighting in the Apennines. They repeatedly stated that divisions must train extensively in the mountains before deploying to Italy.⁷

Command and control was also a problem. Radios were not very useful due to terrain masking, the need for fresh batteries and harsh weather conditions. Relay stations were located on peaks, but they were often targeted by the enemy. The necessity to communicate by means of wire caused units to enlarge their communication platoons. In one division, a total of twenty men were needed just to carry the wire. In another unit, the number of linemen had to be increased by approximately 10 men. One communications officer said in an operation he had as much as 20 miles of wire laid. These numbers were required just to lay the wire - maintaining it was another problem. Messengers were slow but used extensively.⁸

Having discussed the overall tactical situation, the environment in which both divisions operated, and generic problems encountered by all units of the Fifth Army operating in the Northern Apennines, it is appropriate to

examine in detail the background, organization, level of training and the results of combat of the 88th Division and the 10th Mountain Division.

The Blue Devils of the 88th Infantry

The 88th Infantry Division was activated on 4 September 1917. It fought in Haute-Alsace, France during the First World War. In 1919, it returned to the United States and became a reserve unit. The division became one of the "draftee divisions" in 1942 when it was reactivated at Camp Gruber, Oklahoma. The commanding general was MG John E. Sloan. He selected his core cadre from the 9th Infantry Division, located at Fort Bragg, N.C. The 88th's superb cadre was instrumental in the successful training of the division.⁹

The training plan consisted of 45 days of basic and individual training, company/regimental unit training for 58 days, divisional combined arms integration for 83 days, and maneuvers at corps level in Louisiana for 34 days.¹⁰ The initial training was in the Cookson Hills near Muskogee, Oklahoma. It consisted of marksmanship, obstacle courses, close order drill, first aid, field sanitation, map reading, and night compass marches. During the combined training period, the battalions formed into three triangular regimental combat teams and conducted maneuvers as a

division for the first time. Other division commanders praised the 88th for its superb training performance.

In July of 1943, the 88th headed for the Louisiana Maneuvers ready to take on any and all competitors. The maneuvers consisted of daylight attacks, night attacks, defense, assault by armor forces and river crossings. The division established its reputation as an aggressive outfit and was lauded for its ability to maneuver, use artillery and integrate combat support assets. It was rated as the best division during the maneuvers. The physical conditioning of the division was demonstrated by one of its units, the 351st Regiment, when it marched 62 miles in 42 hours without a single dropout.¹¹

In November 1943, the 88th deployed to North Africa with the following order of battle:¹²

Division Headquarters	337th Field Artillery Bn (105)
Division Headquarters Co	338th Field Artillery Bn (105)
349th Infantry Regt	339th Field Artillery Bn (105)
350th Infantry Regt	913th Field Artillery Bn (155)
351st Infantry Regt	313th Engineer (Combat) Bn
38th Reconnaissance Trp	313th Medical Bn
88th Signal Co	788th Ordnance (LM) Co
88th Division Band	88th Division MP Plt
HQB, Division Artillery	

Upon its arrival at Magenta, Algeria, the division conducted extensive reconditioning training for 44 days.¹³

This training focused on mountain climbing, demolitions, mines, marksmanship and physical hardening.¹⁴ In January 1944, it was assigned to Fifth Army and embarked for Italy. When it arrived in Italy, the unit proceeded to Piedmonte d'Alfe for 19 days of mountain warfare training conducted by the Fifth Army Mountain Warfare Detachment.¹⁵

The Blue Devils were finally deployed as a unit on 5 March 1944 at Minturno, (see Appendix A). Operations were limited to defensive patrolling and training. In May, the 88th joined in the Allied push to Rome and drove into the Gustav Line. The initial fight of the division was an assault by the 350th Infantry Regiment on Mt. Damiano. Simultaneously, the 351st Infantry Regiment assaulted Santa Maria Infante with the 349th Infantry Regiment supporting. The final objective, Mt. San Angelo, was taken with very few casualties. The smashing of the Gustav Line was the 88th's first major combat test. It passed with flying colors. In fact, this is where the division received its nickname, the Blue Devils. A German prisoner had stated that the dirty, grimy, Yanks with the blue cloverleaf shoulder patches had fought like devils.

As the soldiers looked north, all they could see were mountains and more mountains. The French Mountain Division, fighting next to the 88th, was pleasantly surprised that an American unit could fight so well in the mountains. The only explanation that could be offered was that it was just

an infantry division who's "feet carried it forward; its guns and guts held the ground it took."¹⁶

After the fall of Rome, the unit crossed the Tiber and then was pulled back for rest and training. In July, the 88th was back on the front and attacking toward Volterra, Laiatico and Vilamagne, finally breaching the Arno Line on July 20th. Once again, the division was withdrawn and allowed to rest and refit. The Gothic Line was the next Allied objective. The 88th initially was put in reserve. It was committed on September 20, 1944, and captured Mt. Battaglia. In October, the division took Mt. Grande and Farnetto and then remained on the defensive until mid January 1945 when it was withdrawn from the line. In April, the 88th participated in the final drive in Italy, breaking through to the Po Valley and pursuing the enemy toward the Italian Alps. On 2 May, 1945, the fighting ceased in Italy.¹⁷ With the background established on the 88th, the paper will now focus on the battle at the Gothic Line, which was the bloodiest and most demanding of all the 88th's fighting.

The II Corps' objective in September 1944 was Bologna. Time was critical, since the winter was fast approaching. In September, the 88th was initially put in reserve. Then, on the 17th, the 88th assumed the offensive on the Corps right flank -- going over terrain that was once thought impassable. On September 20, the 349th and the 350th

Infantry Regiments moved into assault positions poised to attack Mt. Frena with a surprise flanking movement. The 351st was in reserve. The command post of the 1st Battalion, 350th Infantry was attacked by the enemy on September 22, and the entire battalion staff, less the S-2, and the Battalion Commander, were taken prisoner. Despite the fact that the Germans had all the operational maps, Mt. Frena fell.

The next objective was Mt. La Fine, which dominated the area. By 1700 hours on 23 September, the summit had fallen. The Germans counterattacked three times but to no avail. The three regiments were now abreast, with the 349th defending Mt. La Fine and the 350th and 351st attacking Mt. Della Croce and Mt. Acuto. The Germans savagely counterattacked the 350th, but the regiment scaled the heights of Acuto and beat back the Germans.

The battle had become a slugging competition with the Germans fighting every inch of the way and the 88th pushing right back. The 88th started taking heavy casualties because it had moved too far forward of the adjacent division, allowing the Germans to call indirect fires onto its flanks. Other problems arose; the weather closed in surrounding the units with fog, rain and, of course, mud. The signalmen were performing near miracles trying to keep up with the advance of the front line units, as well as the logistic supply lines (with much needed ammunition and

supplies). Due to the flanking fires and the vulnerable lines of communication, the division commander decided that the two peaks, Mt. Capullo and Mt. Battaglia, would have to be taken before the division could advance any further.¹⁸

Mt. Capullo was one of the bitterest battles of the campaign. The 351st Regiment crossed the line of departure at 0845 hours on the 25th of September, five hours later it was in a draw 800 yards southwest of Mt. Capullo. The fight raged up and down the mountain six times, with dead and wounded from both sides littering the ground. The 2nd Battalion of the regiment stalled so the 1st Battalion was sent to assist, attacking the Germans on the flank.

Entire squads and platoons were annihilated by the deadly German machine gun fire. Through the night, the soldiers crawled up the slopes and by first light they were 50 yards from the summit. Once again, the attack stalled and personal from the headquarters companies were committed as infantrymen. Numerous acts of gallantry occurred on the slopes of Mt. Capullo. One unsung hero assaulted a machine gun position, jabbed the machine gunner with his bayonet, then threw a grenade at another, and died assaulting a third.¹⁹ For eight hours the fighting continued with intense mortar and artillery fire raining onto the soldiers of the 88th. Finally at 1536 hours, Mt. Capullo was taken.

The next objective was Mt. Battaglia, which was easily occupied -- only because the Americans got there ahead of

the Germans. This mountain was key to the Fifth Army plan since it was only 11 miles from the Po Valley and provided a panoramic view of the surrounding terrain. The Germans also knew this was key and conducted seven brutal counterattacks. The 351st suffered 50% casualties and lost every company commander except one.

The 88th Division continued its bloodbath, fighting its way through stubborn resistance throughout October and November, leaving a trail of blood at Mt. Grande, Belvedere, Sassalione, Gesso, Mt. Della Tombe, Mt. Cerrere and Vedriano. Finally, the 88th was ordered to hold up. It was relieved and sent to a rest camp to refit. Thus ended the treacherous battles of the Gothic Line for the Blue Devils.²⁰ The Germans were amazed that any unit could have fought through their main lines of defense which took advantage of every aspect of the terrain. The Blue Devils made it, whether through the mountain passes or over the peaks. The 88th Division was untrained in many of the "tricks" of mountain warfare, causing soldiers to pay the ultimate price for the following lessons learned.²¹

Lessons Learned

As stated earlier, the units of the Fifth Army fought a bitter fight in the Northern Apennines. The 88th Division experienced about every imaginable hardship. It fought for

42 days straight. During this time, the division suffered 6,000 casualties. Frequently, it fought independently from the rest of the Corps, cut off from supply lines, while trying to sustain itself on improvisation. The infantry was not alone in its struggles, although more often than not, it had the toughest and dirtiest job. The artillerymen struggled with the huge guns on the narrow mountain roads which were lined with cliffs. The engineers built and rebuilt roads and bridges, cleared minefields, and tried to destroy the numerous German obstacles. The communications personnel used innovative and outright peculiar methods to keep the units talking to each other. There were innumerable times when the wire went dead and a lone wireman traversed the jagged rocks and muddy trails, trying to locate the one or ten breaks in a single strand of wire.

The logisticians used air transport, vehicle, mule, and man to meet the needs of the division. The combat service support personnel were often the unsung heroes of a battle, because without them, the offensive would have ground to a halt. The medics had a truly gruesome job of desperately trying to save the lives of their comrades under impossible conditions. Most of the time the distance to the rear was so great and the trails were so impassable, that they had to conduct medical treatment far beyond their trained capabilities. The mechanics kept the vehicles running, the weapons firing, and the radios communicating. Amidst the

mud and cold, they continued to turn the wrenches and make damaged equipment functional.

As the commanders contemplated the conduct of the Italian campaign and the combat observers produced their reports, what insights did twenty-twenty hindsight provide?

1. Each unit should have selected mountain trained personnel to establish climbing lanes, recon routes, climb to OP positions, act as guides, predict weather, set up rope assistors for narrow defiles, and provide overall expertise in mountain operations.

2. Soldiers who are recruited from mountainous regions make better mountain troops.

3. Morale in the mountains is dependant on the basic necessities of an infantryman: food, water, shelter, warm clothes, changes of socks, and a sleeping bag.

4. Reconnaissance is critical in mountain operations. It is important to attack the enemy, not the terrain. Frequently, leaders focused on securing the mountain versus killing the enemy.

5. The ability to ski would have enhanced the combat capabilities of the unit. The Germans operated freely above the snow line whereas the Allies had to maneuver below the snow line.

6. The best way to use artillery in mountains is against an enemy massing for a counterattack. Artillery is not very effective when used in area concentrations but

should be used on point targets. Rock splinters were found to be more deadly than shell fragments.

7. All combat units should have organic snipers. In the mountains, the range of the standard rifle and sight system is often inadequate for engaging targets that can be observed at a distance.

8. The infantry battalion that operates in the mountains should be self-supporting since it is operating great distances from the support base. The numbers of the combat support and combat service support personnel need to be increased. The battalions should have more engineers, medics, supply personnel and communication personnel so the infantry can concentrate on fighting the war and not on supporting itself.

9. The supply depots need to stock mountain specific equipment so units fighting in the mountains can be resupplied in a reasonable time. These items include mules, packboards, gas stoves, warm footwear, and sleeping bags.

10. Map recons, when computing time/distance factors for movement, are useless. The standard march tables referenced in planning books had to be modified for tactical moves in mountainous terrain. Movement planning became one of the hardest skills to master.

11. The rate of movement is determined by the engineers. They must be positioned up front and be equipped with explosives and hand tools such as light drills.

12. Attention to detail is critical in the mountains. In some environments, a staff officer can get by with some faulty decisions, but in the mountainous terrain and weather, those decisions can destroy a careless unit. A common mistake is the timing of the issue of arctic socks. If the socks are issued after the boots, then the soldiers will have very tight fitting boots resulting in foot problems. This can put a whole unit out of commission.

13. Sixty percent of casualties can be attributed to exhaustion. When the body is worn down, it is susceptible to numerous diseases and injuries.

14. Staffs must have experienced planners in mountain operations that can set the leadership up for success.²²

The facts stated above played a significant part in the outcome of the campaign. These comments were provided by commanders and combat observers who fought in the mountains of Italy. When describing the fighting of the 88th Infantry Division, not all of the aforementioned lessons learned are readily apparent. However, they all played a role in the success or failure of the battles. In any event, the Fifth Army push for the Po failed in 1944.

Unlike the 88th Division, the 10th Mountain Division was specifically designed, trained and equipped for mountain operations. The following is an examination of its background, organization and performance in combat under similar conditions experienced by the 88th Division.

The 10th Mountain Division

The 10th Mountain Division had its beginnings in 1941 when the 1st Battalion, 87th Infantry was activated. This unit was designed to be the vehicle to test doctrine, training techniques, and organizational principles developed by the Mountain and Winter Warfare Board. The focus was mountain training versus training in ice and snow. The unit consisted of regulars from other infantry units and expert skiers from the National Ski Patrol. In 1942, the battalion became a regimental-size force and was stationed with the Mountain Training Center site at Camp Hale, Colorado. The training was focused on special mountaineering techniques such as skiing, climbing, rope installations, and also combined arms operations. Extensive equipment experimentation was constantly conducted. In July 1943, the 10th Light Division (Alpine) was activated. It consisted of the 85th, 86th and 90th Infantry Regiments. The 87th Infantry Regiment was deployed in the Aleutians during this time, so it was not part of the initial organization.

The intention of the Army staff was to develop a unit that could effectively and efficiently fight in the high elevations, using specifically designed equipment and organized to maximize the advantages of mountain operations.²³ The 10th was a draftee division but unlike

the 88th Division. The soldiers were mainly outdoorsmen, trappers, skiers, hunters, and mule skinner looking for fun and excitement and doing the things they enjoyed.²⁴ The National Ski Patrol was an avid recruiter for the unit. The majority of the Mountain Training Center cadre transferred to the division. There were also higher than usual entry standards compared to the normal infantry division requirements. The soldiers could not be over the age of 35 years and had to satisfy special physical fitness requirements.

The training plan for the division followed the standard Army Ground Forces plan. The phase one focused on individual skills. The 10th varied from other units in that it also emphasized individual mountain skills and extensive combat intelligence training (ie. patrolling, reporting and reconnaissance). Phase two consisted of unit training including small unit live fires, road marches, and maneuver training. Phase three concentrated on combined training, better known as the "D series". This was a series of battalion tests and maneuvers conducted under severe weather conditions and at an elevation of 11,000 feet. The 10th Mountain Division veterans stated that these were the most demanding exercises ever conducted. In fact, some veterans said they were harder than actual combat. In conjunction with the phases, each battalion rotated to the Mountain Training Center for one week of training on rock climbing.

mountain marching, route selection and navigation. Ski training was also an additional session for each unit.

The division lost many soldiers and did not reach full strength until March 1944. About 1,000 losses were attributable to the tough training. The high caliber of the remaining men resulted in losses to OCS, aviation school and parachute training. The 90th Infantry Regiment was replaced by the 87th Infantry Regiment in February 1944. The 87th had just returned from the Aleutians and had numerous experiences to share.

The division had some unique equipment requirements that the other units did not have. The 87th Infantry Regiment had tested most of the individual equipment in 1941-1942, but the most significant unresolved problem was that of transporting equipment. Experiments ranged from the use of carts and toboggans, to the use of track vehicles and mules. The problem was that the division could outmarch its ability to move supplies and its organic equipment. A combination of wheeled vehicles, carts, toboggans, M-29 tracked cargo carriers, and mules was finally settled upon, but it still was not adequate.

The lessons learned by the 88th Infantry Division were becoming readily apparent in the rigorous training being conducted by the 10th Mountain Division. The shortages of supply, medical, and communication personnel were noted in subsequent after action reports.

After completing the combined training phase, the division was ordered to Camp Swift, Texas. The mountaineers had proven that they could competently execute their missions in the mountains. They were sent to Texas to see if they could operate in the flatlands. The scheduled maneuvers were subsequently cancelled, but this did not prevent the division from training in the desert. Numerous organizational changes occurred as a result of this most recent training event and the division received many replacements; extensive training continued.²⁵ The 10th Light Division (Alpine) was redesignated the 10th Mountain Division in November 1944. It also received a new commander on Thanksgiving Day, BG George P. Hays. The division finally received the news it had been waiting for - orders to the port of embarkation.²⁶

The assignment of the 10th Mountain Division was a controversial one. The unique design was not attractive to theater commanders. They were concerned with the lack of artillery firepower, since the division had 75mm pack howitzers instead of 105s, and about the lack of motor transport. The division had 6,000 mules and horses in lieu of many of the normal truck assets. Lieutenant General Mark Clark, the commander of the Italian Theater, stated he would take the mountaineers not only because of their expertise, but also because any fresh troops would be a welcome relief to his battle weary corps.²⁷

The Fifth Army was stalled in the Apennines in the winter of 1944. The 10th Mountain Division arrived in January 1945 and was assigned to the IV Corps which had twice failed to capture its 1944 objective of Bologna. Fifth Army wanted to improve the positioning of its corps for the spring offensive and also test the 10th Mountain Division. It designed a series of limited offensive operations. (See Appendix B).

The plan, Operation Encore, required the 10th Mountain Division and the 1st Brazilian Expeditionary Force to seize a series of peaks and ridges that dominated a ten mile stretch of Highway 64. This highway was a major artery into the Po Valley and was used extensively by the Germans. The objective of the mountaineers was the Monte Belvedere-Monte Della Torraccia Ridge network which dominated the region with peaks ranging in height from 3000 to 5000 feet. An implied task was the capturing of Serrasiccia-Campiano Ridge, better known as Riva Ridge, which overlooked the entire left flank of the proposed route of movement and provided excellent overwatching fires onto the objectives. On one side of Riva Ridge was a 1500 foot cliff face - a perfect mission for the highly trained 10th Mountain Division. Once these objectives were taken, the division was to move northeast approximately four miles to seize a chain of ridges which had road networks leading into the Po Valley. The Brazilians were to cover the right flank of the

10th Mountain throughout the operation. Realizing the shortfalls of the division, the corps commander attached a 105mm howitzer battalion, a 4.2" chemical mortar battalion, two tank destroyer battalions and a tank battalion to the division. The terrain was very rough with limited road networks so the mules were a great transportation asset for the division.

On 18 February 1945, the 10th Mountain Division initiated its first major operation of the war. Climbing teams were sent out that evening to establish lanes up Riva Ridge's 1500 foot cliff for the follow-on troops. Artillery fires covered the noise of the team's movement and the hammering of pitons. These climbing teams were drawn from the three companies of the 1st Battalion, 86th Infantry and one from the 2nd Battalion, 87th Infantry. Once the lanes were established, the main body of the 1st Bn, 86th Infantry moved up the routes, scaling the cliff with ease. Co C, 1-86th had the most difficult terrain; their climb proved to be long and tedious. By dawn, the majority of the battalion was on top of the ridge and had encountered only minor resistance.²⁸

The Germans had been replacing units on the ridge line and were only able to mount three inconsequential counterattacks during the day. On one attack, the Germans feigned a surrender, moving forward, waving their hands, then they dropped down and started to fire. They too were

repulsed. Everything was ready for the 10th Division's main attack to proceed.

The next night, the 85th and the 87th Infantry Regiments attacked, dispensing with artillery preparation in hopes of attaining surprise. The 85th conducted a frontal attack against Monte Belvedere and Monte Gorgolesco, while the 87th attacked up the western slopes toward Valpiana Ridge. The 87th surprised the Germans on the ridge, fighting through a series of trenches, machine gun bunkers and three villages. Two of the 87th's companies became pinned down from artillery fire and machine gun grazing fire from the top of Mt. Belvedere. Through a series of bypasses, the companies were able to maneuver out of the area. With the capturing of this ridge, the 87th had outflanked the German defenses on the crest of Mt. Belvedere.²⁹ The risk of conducting a five battalion night attack with unproven units had paid off and achieved maximum surprise.

The 85th fought a bloody battle the last 300 yards from the summit of both mountains. Monte Della Torraccia proved to be a tough fight. On the afternoon of the 21st, the 2nd Bn, 85th Infantry led the way up the slopes but soon started to take heavy casualties. The battalion commander and the heavy weapons company commander were killed by the effective German counterbattery fire. Throughout the night and the next the day, the battalion clung to its gains only 400 yards short of the objective. Finally, MG Hayes committed

elements from the 86th to achieve victory. Supporting fires from the remainder of the 86th on Riva Ridge and from the 87th, plus heavy artillery fires, were decisive in the 85th's capture of the two peaks. Air support was also integrated into the attack with fighter-bombers flying a total of 412 sorties. By the evening of the 22nd, the heights from Riva Ridge to Monte Castello were in Allied hands. The division had suffered 900 casualties, 203 of which were killed.

Phase II of the 10th Mountain Division's limited offensive started on 3 March. The 86th and the 87th Infantry Regiments were abreast and moved forward to capture a series of peaks which were to serve as the jump off line for the Fifth Army spring offensive. The peaks were Monte Grande d'Aiano, Monte della Spe, Monte della Castellana, and Monte Valbura.

Within two days, all intermediate objectives were taken and the 86th and 87th were on Monte Grande d'Aiano. The 85th was committed into the fight to take Monte della Spe and Monte della Castellano. The Regiment encountered the heaviest German resistance, but the 1st Battalion, 85th fought through and took Monte della Spe. The 2nd Battalion, 85th Infantry could not advance up Monte della Castellana and had to withdraw. It tried another route and was successful. American casualties for this operation were 106 killed and 443 wounded.

The Germans were unsure of American intentions, so they committed their major reserve in the area. The Allies, fearful that the Germans would dig in on Highway 64, halted their drive having poised themselves for the spring offensive. The 10th Mountain Division controlled a six mile front between Monte Grande d'Aiano and Highway 64. It had proven itself in its first combat operation.³⁰

The 10th Mountain Division did not win the war in Italy, but it did facilitate the spring offensive which completed the conquest of Italy. IV Corps, including the 10th Division, launched the spring offensive toward Bologna. The 88th Infantry Division was to the west in the II Corps' sector. The 10th Mountain Division led the attack with Mt. Rocco Roffino as its objective with the follow-on objectives of numerous peaks leading into the Po Valley. On 21 April, Bologna fell. The Panaro and Po Rivers were next.

The 10th organized a task force of armor, infantry, engineers, and artillery which seized crossing sites on the Panaro River. Once consolidated, the task force continued to the Po River. The division made an assault crossing under fire. The mountaineers continued their march toward Verona with a final objective of Lake Garda. The 10th Division staged an assault across the lake in hopes of capturing Mussolini's headquarters, but the Fascists were already in flight to Switzerland. The 10th Mountain Division's advance was halted on 2 May 1945, when the

Germans surrendered.³¹ The chapter was closed on the combat operations of the 10th Mountain Division.

The only mountain-trained unit took up the battle where other forces had twice failed. Other infantry divisions had received limited training in mountains and had achieved their objectives in the mountains. The lessons learned by the 88th Infantry Division were the same ones that the 10th had for the most part, already mastered in the Colorado mountains. Before entering the combat zone, organizational designs were changed, based on these lessons. The shortages in medical, communication and logistics personnel were not as severe in the 10th, because additional personnel were already in the units. The logistical support dilemma that faced the 88th also faced the 10th, but the mountaineers had mules, weasels (track vehicles) and packboards designed to haul equipment. The units in the Fifth Army received equipment to protect them from the elements and help them operate in the mountains. The key difference between other divisions and the 10th was that the soldiers in the mountain division were trained on how to properly use the equipment.

The war did not prove that standard U.S. infantry divisions could not fight in the low mountains. It did prove that a unit specially trained, organized and equipped to fight in the mountains had fewer casualties due to the effects of the weather, the terrain and the enemy.³²

The lessons learned or demonstrated by the 10th Mountain Division were:

1. If a unit operating in the mountains has been trained in the technical aspects of mountaineering, it can use the terrain to a greater advantage and attack the enemy from an unexpected direction.

2. The 10th only used ski operations one time, for a reconnaissance patrol. They devoted too much time to ski training during their pre-combat period. Leaders need to make an assessment of the time spent on ski training versus actual use and benefits.

3. Corps commanders must supplement mountain units with adequate artillery, tanks, and ground transportation.

4. The division's training focus on small unit operations paid great dividends during the Italian campaign. Small unit leaders continued with their mission, even though they became separated from parent units.

5. The mountaineers had experienced avalanches, rock falls, mountain sickness, exhaustion, severe weather, frostbite, and deep snow before they were deployed into the combat zone. This was a definite advantage over the other divisions.

6. Additional mortars benefitted the tactical operations of the small units.

7. Antitank assets should be consolidated and used to control mountain passes and road networks.

8. As stated in general terms above, the larger service companies, engineer battalion, medical battalion and signal company allowed the front line units to maintain their infantry "foxhole strength" and provided significantly better support.

9. Due to the lack of 105mm howitzers, the direct fire capabilities of the division should be increased by doubling the amount of Browning Automatic Rifles and .30 caliber machine guns.

10. Engineer sapper teams when positioned up front with the infantry greatly assisted the mobility of the units.

11. Signal men, having the ability to climb, were able to use more direct routes for laying wire and had greater access to terrain features for relay points.

12. The capability to install rope suspension traverse systems for evacuation and supply both up and down the rugged terrain saved a tremendous amount of time and effort.³³

A Comparison of the Two Units

Did a Mountain Unit Make a Difference?

The mountaineers achieved a significant victory allowing the Fifth Army to jump off into a spring offensive. The 88th Infantry Division was also successful in its operations in the mountains. It provided an excellent offensive momentum for the II Corps. The Blue Devils were able to keep up with the French mountain units and gained a healthy respect from the Germans. In short, each division was successful in the eyes of its own chain of command. Reviewing the histories of the units, both are glorious and highlight success. How can one make a determination if a mountain trained unit made a difference? First, there are a number of common sense factors that are readily apparent.

Any unit trained specifically for an environment is going to perform better than one which has a general training plan which includes numerous environments. Both divisions excelled in their own training programs. The key difference was that the 88th learned how to operate in the mountains the hard way - paying by loss of lives. The Blue Devils did receive some mountain specific training but only a rudimentary base of knowledge was established. The 10th learned how to operate in the mountains before being deployed into the combat zone.

The differences in the organizations reflected the lessons learned early in the campaign as noted by the combat observer reports and through the training in the mountains by the 10th Mountain Division. A unit with the additional combat service and combat service support personnel will definitely be able to better accomplish its mission. Mountain units have a balanced mix of weapons and equipment but need to be augmented in artillery and antitank weapons for major operations; additional transportation assets are required for movement in the flatlands.

The 88th's prior training focused on conventional maneuvers, but when the unit entered the mountains, its leaders realized that the key to success was small unit operations. Its soldiers suffered from poor leadership at the junior level during the first stages of combat. Some units lacked supplies due to inexperienced staff officers who did not compensate for the difference in time/distance factors in a mountain environment. Soldiers died as a result of leaders not knowing how to adjust artillery/mortar fires in the mountains. Others suffered because they did not know how to use the equipment with which they were provided to operate in the mountains. They became exhausted, lost limbs, and did stupid things, all because leaders pushed too hard.

The mountaineers were able to conduct an attack from a approach which no other unit could have done in the

mid-1940s. They achieved surprise, which doubtlessly saved a number of lives. Overwatching fires were provided from the heights for an attack that would otherwise have ended up like the two previous attempts...in defeat. Supplies reached the forward line of troops. Wounded soldiers were stabilized on the frontline and then evacuated promptly. The chain of command maintained communication with its forward units. Small unit leaders in their first combat experience acted with initiative when separated from their commanders. The planning done by the staff and commanders proved to be accurate and was implemented successfully. The analysis of the terrain was exact, and the capabilities of the soldiers were not exceeded. So, did the trained mountain unit make a difference?

Major Melvin Richmond concludes in "Combat Operations in Mountainous Terrain--Are United States Army Light Infantry Divisions Preparing Properly?", that training is the key difference to success for operating in the mountains.³⁴ This is partially true based on the analysis of the two divisions above, but it also appears that the organization of the unit for combat in the mountains is another key ingredient. The soldiers answered the call in the rugged terrain of the Apennines and were successful in bringing the Germans to their knees. If called upon again, where else might we expect to fight in the mountains?

Current Deployment Areas

The United States faces the employment of troops in a variety of terrain, including the mountain environment. When the deserts, jungles, arctic regions and mountains are eliminated from consideration, areas for the conduct of conventional warfare become significantly reduced. Approximately 42% of the earth's land mass is mountainous.³⁵ Mountain regions can be divided into the following compartments: Europe, Middle East, South and Southeast Asia, Far East, Africa and the Americas. The majority of recorded history on mountain operations focuses on mountains which are near moderate environments such as the lower ranges in Europe and Southeast Asia. The relief in these areas is greater than 320 feet per square mile and the typical slope is between 8 degrees to 40 degrees.³⁶

What is mountainous terrain? According to FM 90-6, Mountain Operations, the geography of mountain regions can militarily be divided into three types: alpine ranges, interior ranges, and coastal ranges. Each major range is different due to its climatic pattern, altitude, latitude, surface and soil configuration. The major mountain ranges of the world lie in broad belts called cordilleras. These massive belts ring the Pacific basin and extend across Eurasia into North Africa. Another belt lines the Atlantic borders of Europe and America. The Eurasian mountain belt

consists of the Atlas Mountains in North Africa and the Carpathian, Balkans, Alps and Pyrenees in Europe.³⁷

The Alps are good examples of "alpine ranges." They are characterized by high jagged peaks, steep valleys, small lakes, barren bedrock and talus/scree fields of rocks. Glacial ice and snow are normally on the ground throughout the year. Valleys are formal lines of communication which have abrupt slopes and rise to narrow passes. Units can easily become separated in alpine regions.

"Interior ranges" historically are choice invasion routes. The Caucasus Mountains in the Soviet Union are an example of one of these routes. In the fourteenth century, Genghis Khan spread fear and destruction throughout the Middle East by crossing over these mountain passes.³⁸ Complex, interior ranges have a multiplicity of land features with sheer slopes and towering crags above the timberline. Foliage covers the valleys and rolling meadows. Snow accumulation makes movement difficult; this is compounded during spring breakup due to the torrential streams and rivers. The valley floors are harder to control from the heights due to the rugged terrain.

"Coastal ranges" have been carved by the glaciers and erosion. The mountains on the southern coast of Chile are excellent examples of this type of terrain. Due to the steepness of the terrain, the slopes are barren of vegetation. Both interior and coastal ranges can be found

in desert, tropical, arctic and temperate climatic zones.³⁹

The zones of potential conflict for the United States include Europe. This region can be divided into the Northern Flank, Central Front, Southern Flank, and the Caucasus Mountains. The likely adversaries, the Soviet Union and Warsaw Pact Nations, possess numerous forces that train in mountain environments. The major mountain ranges in the Central Front are the Thuringer Wald, Harz, the Vogelsberg Mountains and the northern part of the Alps. The approaches into Italy pass through a maze of tunnels which provide high speed approaches through the land masses. The highest peak in this area is to the south, the Zutspitze which is 9,720 feet.

The Northern Flank's only significant mountain barrier is found in Norway which splits this NATO country from its Allies. The channeling that occurs on limited road networks, proves to be a major obstacle to maneuver. The coastal mountains are filled with fjords and rugged rocky surfaces. The highest peak in Norway is 8,110 feet. The severe climatic conditions make this area a significant challenge for soldiers.

Italy, Greece and Turkey comprise the Southern Flank of Europe and have considerable mountain complexes. The northern border is ringed by some of the highest mountains in Europe. In Italy, the Apennines Mountain Range traverses the entire length of the peninsula with Mont Blanc in the

north towering to 15,787 feet and other peaks such as Monte Rosa rising to 15,203 feet. Turkey is a mountainous country with coastal and interior ranges. The highest peak is Ararat which is 16,945 feet. Greece has the Olympus, Pindu, Othrys, Cyllene and the Erymanthus Mountain ranges. Mytikas is the highest mountain - 9,550 feet.

The terrain feature that divides Europe from Asia is one of the most treacherous military barriers on earth - the Caucasus Mountains. Once again, the likely enemies are the Soviet Union and the Warsaw Pact nations. The Hittites, Assyrians, Persians, Romans, and Byzantines, all have spilled blood in the rugged Caucasus Mountain passes. The highest peak in Europe is in the forerange of these mountains - Mount Elbrus, 18,470 feet. There are three traditional invasion routes starting in the Soviet Union and moving into Turkey, and Iran: the coastal route along the Black Sea which is dominated by ranges of 10,000 feet; along the River Aras; and the third is not passable to its end but leads into Malazgirt and Lake Van. Turkey is the vanguard for NATO in the region. In 1914, Turkey lost 50,000 soldiers out of 95,000 when it tried to invade Russia through these routes.

The next possible zone of conflict in mountainous regions is the Middle East. The countries involved in this region are Israel, Syria, Jordan, Lebanon, Iran, Iraq, Kuwait, Saudi Arabia, Bahrain, Qatar, United Arab Emirates,

Yemen, People's Democratic Republic of Yemen, and Oman. The United States, based on its vital interests, could easily find itself employing troops in this region. The terrain varies from desert plains and large plateaus, to 18,610 foot mountain peaks. The following are the highest peaks in their respective countries:

Israel	Mt Meron	3,960 ft.
Syria	Mt Hermon	9,230 ft.
Jordan	Ramm	5,750 ft.
Lebanon	Makmel	10,120 ft.
Iran	Damavand	18,610 ft.
Iraq	Algurd	12,250 ft.
Kuwait	-	-
Saudi Arabia	Razikh	11,990 ft.
Bahrain	-	-
Qatar	-	-
United Arab Emirates	Adhan	3,700 ft.
Yemen	Hadur Shuayb	12,340 ft.
PDR of Yemen	Thamar	8,240 ft.
Oman	Sham	10,190 ft.

Note: Countries with no figures do not have significant relief features.

The topography of the Middle East is very diverse. The most significant mountain ranges are: the Jabal al Nusayriyah, and Anti-Lebanese Mountains in Syria; the "Armenian Knot", including the Zagros and Elburz Mountains, which have protected Iran from its enemies throughout history; the Tihamah Range which runs along the western border of Saudi Arabia down into Yemen; and numerous plateaus and highlands ranging from 3,300 to 10,000 feet interspersed throughout the entire Middle East.

South and Southeast Asia are additional hotspots which

have numerous potentials for combat in the mountains. The "mountain warfare school" for the Soviet Union is currently in session in one of these countries - Afghanistan. Terrain has always been an obstacle for the foreign invader in this rugged country. The Hindu Kush Mountains stretch out like a long hand from the eastern to the western borders of the country. The Pamirs Mountains, the highest range, line the border between Afghanistan and China, Soviet Union, Pakistan and India. Guerrillas can operate very effectively from mountain retreats in these areas.

India and Pakistan have two of the tallest peaks on the continent. Kangchenjunga in India rises to 28,170 feet, while Tirich reaches 25,260 feet. The Lesser, Southern and Outer Himalayas bound the northeast border of India, and the Hindu Kush Mountains from Afghanistan line the northwest border of Pakistan. The Siahian and Central Makran Ranges are in the east part of Pakistan. The famous Khyber (5900 ft.) and Gumal (7500 ft.) Passes are located in northwest India. Throughout the Soviet invasion of Afghanistan, there has been talk of positioning United States troops in Pakistan to contain the Soviet influence.

Vietnam, Kampuchea, Thailand and Malaysia are the key countries in Southeast Asia. The central and northern sections of Vietnam are characterized by hilly regions. The highest peak is Ngoc Linh at 10,500 feet. Vietnam has always feared intervention from the Chinese, but the large

mountains that line the border have obstructed a southward push by China. In Kampuchea, the Cardamome Mountain range has the 5,950 foot peak of Aural. Thailand's highest mountain is the Doi Inthanon in the Phi Pan Nam Mountains at 8,450 feet. Three other ranges in this country are the Dawna Range, the Bilauktaung Range and in the southeast, the Phanom Dong Rak. The last country, Malaysia, has a mountain peak in the Cameron Highlands - Tahan, which reaches 7,190 feet. The U.S. interests focus on countering the spread of Communism in the area. Thailand is United States' strongest ally in the region.

The Far East region consists of the two Koreas, the Asian part of the USSR, China, and Japan. North and South Korea are countries of severe climate and rugged landscape. The majority of the region is mountainous, especially in the north. The Taebaek Range has several peaks over 8,000 feet and is a dominant feature that contours the length of the countries. It provides numerous chokepoints amidst well developed roads. The tallest mountain in the north is Paitou, 8,900 feet, and in the south is Halla at 6,400 feet.

The USSR has vast mountain regions consisting of the Pamirs, Caucasus, Urals, and Kamchatka Mountains. The highest peak in its Asian land mass is Kommunizma towering to 24,590 feet. Due to the mountains that line some of its borders, many of the USSR's divisions constantly train in the mountains.

China's topography is varied. Great mountain chains divide its borders with Afghanistan, Pakistan and India. Smaller ranges separate China from Burma, Laos, Vietnam and Korea. The tallest mountain in the world is located near the China and Nepal border. Mt. Everest is in the Nepalese Himalayas and is 29,030 feet high. China has vast plateaus in the Southern Himalayas that reach to 10,000 feet. Other ranges are the Kunlun Mountains, the A-erh-chin Shan-mo, Nan Shan, Tien Shan, and the Great Khingan Mountains.

Africa has coastal and interior ranges. The Atlas Mountains are in the northwest part of the continent. The highest peak in this region is 13,671 feet. Ethiopia has a high plateau region which has severe 1000 foot drop-offs. The Kenya, Killimanjaro and Ruwenzori Mountains are in the east. This is where Mt. Kibo, the highest peak in Africa at 19,340 feet, is located. The Drakensberg Mountains are in eastern South Africa. In Western Sahara, there are two mountain regions with 3000 foot peaks. Chad has the Tibesti Mountains with two large plateaus called the Ennedi and Ouaddai. The United States' major role in the region is to curb the Soviet Union and other communist nations, such as Cuba, from expanding their influence. Libya is a constant thorn which could lead to U.S. involvement.

The last zone is the Americas. Mexico has the Sierra Madre Mountains which divides into two separate mountain chains on the east and west sides. They average 6,000 feet

with Citlaltepetl being the highest at 18,700 feet. The Andes Mountains cut down the middle of the land mass with Tajuimulco in Guatemala the highest point at 13,845 feet. In South America, the entire west side along the Pacific has the Andes Mountains with the tallest peak at 23,834 feet (Aconcagua). The border between Argentina and Chile is almost a complete mountain barrier. In the north, the Serras Curupira, Parima and Acarai and the Tumuc-Humac Mountains traverse mainly through Venezuela and Brazil. There are a series of highlands in eastern Brazil and in the south is the Cordoba Mountain range in Argentina.⁴⁰

This overview has been a quick look at the major mountainous regions throughout the world where the United States may have to deploy forces. The highest elevations were mentioned only to highlight the extremes in geography throughout the world and establish the parameters for possible employment. Acclimatization is an obvious need in order to operate in some of the severe heights. The lessons learned from the 88th Infantry Division and the 10th Mountain Division, along with the analysis of mountainous regions, emphatically point out the requirement for a force to be able to meet the needs of mountain warfare. Numerous U.S. allies have recognized the need for mountain troops.

Obviously, in a number of these regions, the U.S. would not be able to rely on its allies for their mountain units. The next chapter will discuss a few of our European allies'

capabilities and the current force within the United States Army that is supposed to fight in the mountains, and hopefully win.

CHAPTER 3

MODERN RESPONSES - COMPARE AND CONTRAST

Several nations worldwide have soldiers assigned to specific units designed to conduct operations in mountain environments. This chapter will overview a few of these countries with an emphasis on the German mountain units. The United States' current capabilities will be analyzed focusing on the light infantry battalion and the 3rd Battalion, 172d Infantry (Mountain). The background, mission, organization, training, capabilities and limitations of each unit will be reviewed. A contrast will be drawn between the German unit, the U.S. light infantry battalion and the U.S. mountain battalion using the dynamics of combat power - maneuver, firepower, protection and leadership.

The countries with significant mountain ranges within their borders normally have mountain troops. They have focused on a very simple, but most important, operational principle: fight in the mountains with mountaineers. Chile, Argentina, Peru, Norway, France, West Germany, Austria, Italy, Spain, Switzerland and India are among the countries that have mountain units.

The countries that possess mountain infantry forces all maintain similar basic precepts. These fundamental concepts can be traced to the Alpine forces of Austria and to the French, Italian and Swiss armies. The mountain soldiers of these armies were normally of higher quality and possessed greater physical stamina than the average infantryman. These units were uniquely cohesive since they were recruited from and operated in their own locality. They possessed a non-linear operational approach to the battlefield focusing on area-defenses and surprise flank attacks. All were specially designed to meet the harsh demands of operating in a mountain environment (for example, they possessed lighter artillery).⁴¹

The 27th Mountain Division

France has maintained mountain units since 1874 because half of its boundaries cross mountain masses. The 27th Mountain Division is stationed in the Alps and has the following mission: defend the border along the Alps and reinforce the 1st Army and participate in combat operations over the theater of Central Europe. The organization centers around three basic principles: simplicity, light-weight, and capability to operate in a decentralized mode. It is divided into two brigades consisting of: (See organizational diagram, Appendix C, Figure 1) -

- 6 mountain infantry corps*
- 1 armored regiment
- 1 mountain artillery regiment
- 1 command/support regiment
- 2 light helicopter squadrons
- 1 engineer company

* Corps is the same as U.S. battalion-size elements

The two "Demi-Brigades" concept is based on operations in independent areas and sustainment. The infantry battalions consist of three companies with three sections. In each battalion, there is a ski scout section, a learning section (or instructor section), a heavy mortar section (120mm), and a Milan antitank section. The armored regiment has the AML 90 tank. The mountain troops consist of high quality personnel whom are located in the high mountains regions and use specialized equipment.

The French military doctrine divides mountain combat into three areas. The first level is combat at the bottom of the valley. This is dominated by mechanized and motorized forces that are familiar with mountain operations and know how to survive in cold weather and move over the snow. The second level is the shoulder of the mountains. Light infantry units that have rudimentary knowledge in snow science and operations in rugged terrain can be used here to dominate the valleys. The third level is the peak region or

the region of secondary maneuvers. This is where the mountain infantry are employed. They are the only forces capable of operating in this terrain and capable of influencing the enemy's maneuver through infiltration and attacking his flanks or rear.

The French feel that even with the advent of the helicopter, nothing takes the place of the trained combatant on the ground. Officer technical training consists of three years of qualification and testing. The training includes:

- mountain climbing techniques
- raid techniques on skis with loads
- mountain life saving
- movements
- landing at high altitudes
- equipment
- knowledge of the environment, including meteorological data

The education of the NCOs is just as extensive and time consuming. The challenge comes in training the private soldiers, who are on a twelve month military service. Individual training focuses on skiing, raids, marching and surviving in extreme temperatures at altitudes of 3,000 meters.⁴²

The Alpinis

Another respected mountain organization is the Alpini Mountain Corps of Italy. The Alpinis were formed in 1872, and have since been employed in Libya, China, Albany, and of course, in Italy during the two world wars. Historically, the Alpinis have been very technically competent but their leaders wasted their talents by using poor doctrine and tactics in combat. An example of this was in World War I when they were used in trench warfare and frontal assaults. They were slaughtered by German and Austrian mountain troops employing classic Jager tactics. The mission of the Alpini is to defend the territorial integrity of Italy in the mountainous regions and to be able to fight in any environment.

Italian mountain soldiers are assigned to the 4th Alpini Corps, which is divided into five brigades (identified by their area of operation - Taurinense, Orobica, Tridentina, Cadore, and the Julia Brigades). Each brigade is organized as follows: (See organizational diagram, Appendix C, Figure 2) -

- Headquarters
- 3 Alpini battalions
- 1 signal and service unit
- 2 artillery battalions (105mm pack/155mm howitzers)
- 1 engineer company

-1 antitank company

-1 logistics support battalion

The brigade normally fights in three Alpine Combat Teams each of which consist of an infantry battalion, a 105mm pack howitzer battery, a field hospital and various brigade support slices. Depending on the situation, the brigades normally retain control of the 155mm howitzers, the antitank and the air defense assets. Each battalion has a mortar company with six 120mm mortars and six 81mm mortars. The battalions have an Alpieri platoon which consists of technical experts proficient in assault climbing and operating for extended periods of time behind enemy lines. The Taurinense Brigade has an airborne battalion.

The Italian doctrine has evolved from static positional warfare to mobile maneuver operations. Currently the doctrine requires a forward defense, defined as control of key areas, focusing on the confluence of movement fissures (or passes) through the mountains. Control of these fissures will be done through "maneuvers extending out of the wide spaces that increase the operational capabilities of small, mobile, and autonomous groups."⁴³ Instead of a focus on holding ground as in the past, mountain operations will have spatial discontinuity, using maneuver to destroy the enemy.

The training is divided into three cycles. The first cycle, basic training in military skills, lasts for two

months and is shared by the recruit training battalion and the unit itself. The second cycle, focuses on integrating the soldier into a squad or team, and is conducted by the company. The third cycle covers the last eight months of the soldier's enlistment. It focuses on operations with and without snow in a mountain environment. Climbing, movement techniques on skis, winter exercises and spring raids are the major topics. There is a core cadre which consists of the professional officers/NCOs of the Italian Army. The cadre is technically and tactically competent in mountain operations.

The Gebirgsjagers

Another country that has an elite mountaineering unit as competent as the French and Italian mountaineering forces is Germany. The German mountain infantry is called the "Gebirgsjager". This force was selected for closer examination for the following reasons:

1. Historically, the German mountain units have fought heroically and are recognized as an elite force.
2. The United States Army greatly respects the doctrine of the German Army.
3. Within the last seventy years, the evolution of German mountain doctrine has been well-documented and provides valuable insight.

The German philosophy on mountain warfare focuses on one basic principle: "the holder of the hills dominates the valleys."⁴⁴ Edward Luttwak, United States military historian, states that "German mountain-infantry tactics as last used in the Second World War, and suitably modified to take due account of helicopter mobility, may be the single most important body of modern tactical expertise."⁴⁵ The German focus is to decrease the reliance on firepower and exploit agility of aggressive offensive operations. It is by no accident that the executors of the fluid counterattack tactics and the mobile theater strategy of WW II, Generals Rommel, Jodl, Halder, Dietl and Kuebler, were generals with roots in mountain infantry.

The mission of the "Gebirgsjager" is to conduct operations in the high mountains and rugged terrain. It must also meet the challenge of forward defense against a mechanized aggressor on the eastern border. At first glance, it appears that there is an entire division of mountain troops in the German Army. The 1st Mountain Division is one of twelve divisions in the Bundeswehr. It consists of: (See organizational diagram, Appendix D, Figure 1) -

- 2 armored infantry brigades
- 1 armored brigade (+)
- 1 mountain infantry brigade

- 1 artillery regiment
- 1 helicopter squadron
- 1 signal battalion
- 1 armored reconnaissance battalion
- 1 air defense regiment
- 1 engineer battalion
- logistic support base

The assets of the division are listed to show the variety of units that are available to support a mountain infantry brigade. The "Gebirgsjagerbrigade 23" is the only pure mountain infantry brigade in the German Army. Its structure is unique due to its mission, equipment and training. The unit is able to operate effectively in deep snow and under severe weather conditions. In fact, its training areas and bases are in the part of the Alps which have the deepest snow, most number days of sub-zero temperature and, of course, very rugged terrain. The Germans feel it is imperative to have a unit that knows how to survive in the mountains. They reflect back to World War I when more soldiers on the Alpine Front died due to avalanches and cold weather than from enemy bullets. Thus, the German mountain brigade represents a battle proven mountain organization.

The brigade consists of: (See organizational diagram, Appendix D, Figure 1) -

- 4 mountain infantry battalions
- 1 mountain artillery battalion

- 1 brigade reconnaissance platoon
- 1 mountain anti-tank company (17 Leopard I tanks)
- 1 mountain pack animal company (54 horses/mules)
- 1 mountain service company (repair/supply operations)
- 1 mountain engineer company (AVLBs, mine launchers)
- 1 mountain CBR defense company

The mountain infantry battalions consist of:

- headquarters and service company w/ alpine platoon
- 3 mountain infantry companies w/ 4 platoons (3 squads)
- 1 heavy mountain infantry company which consists of a mortar platoon, a field gun platoon (20mm), and a Milan platoon

Total strength of the battalion is 872 mountaineers.

The mountain infantry can move its entire element on skis and is airmobile. The weapon density is as follows:

- Heckler & Koch 7.62mm G3 rifles w/ folding stock is the standard issue
- 96 G3SG1 sniper rifles (1/3 equipped w/ night vision devices)
- 1 MG3 per squad (machine gun)
- 74 light anti-tank weapons (shoulder fired)
- 21 Milan guided anti-tank rockets (range @2000m)
- 6 20mm field guns
- 7 120mm self propelled mortars

There are six 4X4 vehicles fitted with digging equipment. The battalion has the capability, with its wheel vehicle assets, to move the entire unit in one lift. The total anti-tank capability within the brigade is 17 tanks, 84 Milans and 400 light antitank weapons.

The alpine platoon deserves special attention. This is a special platoon consisting of army mountain guides. When the battalion maneuvers over rugged terrain, the guides emplace fixed rope installations using artificial anchors, establish rappel points, construct Z-Pulley systems and any other mountain specific techniques to assist the battalion's movement. The platoon also conducts reconnaissance and combat operations in the high alpine terrain. There are also mountain guides in each mountain infantry company.

The guides are trained for eight months in the summer and winter. A summary of the training is:

- 6 weeks of high altitude patrolling and climbing
- 3 weeks of ice climbing
- 2 week exercises in the Dolomites and on Watzmann Mountain
- 8 weeks of ski training
- 2 weeks of high altitude ski patrolling
- 1 week of guide instruction
- 2 weeks of exercises and evaluations

The training for the regular soldiers is as follows:

- mountain/infantry combat; 45% is conducted in the

- mountains
- physical fitness
- airmobile operations
- combined arms training (especially with tanks)
- mountaineering
- combat in built up areas
- mountaineering sporting events with other nations⁴⁶

The German Army makes a distinction between the Jaeger (light) forces and the mountain infantry forces. The mountaineers possess the capability to function in the mountains during both summer and winter. The unit has a strong armored and anti-armor capability. It can conduct independent combined arms operations and has the transportation assets to operate in the valleys and in the mountains and throughout the battlefield, under CBR protection.⁴⁷

One of the key differences between the regular soldier and the mountaineer is his esprit-de-corps. The Germans feel that the mountaineer is not necessarily outwardly aggressive but displays a high degree of self confidence in his abilities. The mountain units, unlike the other forces, are trained to operate independently for extended periods of time. Due to the nature of their operations and the physical hardships they endure, the soldiers are masters at pacing themselves. The "Gebirgsjagerbrigade 23" is a very capable fighting force, organized, equipped and trained to

fight, sustain and win in the mountains.⁴⁸

The United States Army Light Infantry Division

Having reviewed an ally's mountain force, the United States' active duty unit designated to fight in the mountains will be analyzed. The concept of a light infantry division in the United States Army is not new. In the 1940s, light divisions were studied and designed to be lighter than the standard infantry division, able to operate in restricted terrain, easier to load out and deploy, and be combat soldier heavy. Three experimental divisions were formed. They were reorganized because World War II theater commanders did not like the concept and rejected the lighter force. The test maneuvers demonstrated some major flaws in the force design.

During World War II, General MacArthur felt that the light divisions lacked adequate firepower, were poorly organized for sustained combat in rugged terrain and lacked depth.⁴⁹ The concept of specialized units for jungle, amphibious and mountain warfare evolved from these tests. The only unit that survived the trials and experiments of the time period was the 10th Mountain Division. The design concept for the light division of the 1980s' has some similar specifications plus additional characteristics.

Today, the light infantry division has been established

to act as a deterrent force that can react quickly in low intensity scenarios.⁵⁰ Its design concept focuses on the commonality of equipment, supplies and organizational structure. Non-combat soldiers are reduced to a minimum, thus restricting combat service support assets. As a result, the logistical support system is based on an area support concept. In fact, the capabilities statement states that light infantry units need not be self-sustaining. It is streamlined to operate in low to mid-intensity conflicts and retains utility in high-intensity environments when properly augmented. If an asset was not used, for example an NBC company, it was cut out of the Table of Organization and Equipment and relocated at corps. Since resources are short, often the division pools equipment at its level to support the overall mission. The design ensures that the combat support assets are compatible with the division's foot mobility capability. There is an increased leader to led ratio, since the platoons, squads and sections are smaller when compared to regular infantry units.

"The light division is organized, equipped, and trained to conduct combat operations on the battlefield under all environmental conditions." The capabilities of the division include conducting operations in any terrain. It can attack to defeat light enemy forces or seize terrain. The light division can reinforce forward deployed forces by full integration into their operating and support structure. A

common use is as an economy of force unit on close terrain. This frees armor and mechanized forces for operations elsewhere on the battlefield.⁵¹

The light infantry division can operate for 48 hours without additional assistance. It is very effective in urban areas and can be tasked with rear area operation missions when properly augmented with mobility assets. The organic force can be adequately controlled, and the division can quickly integrate and command and control any augmentation force. The division cannot conduct a forced entry into an area but it can participate in amphibious operations. It can conduct air assault operations with the limited organic aviation assets lifting up to one battalion at a time.

The light division has several limitations and vulnerabilities. Its tactical mobility is constrained by limited organic vehicles and aircraft. The division has limited military intelligence assets. NBC reconnaissance, deliberate smoke production and decontamination can be handled to a limited degree. Air superiority and naval gunfire support are normally required for combat operations. The division is very vulnerable to heavy artillery attack as well as NBC tactical strikes. If the enemy focuses on the division's lines of communication, the unit will be severely constrained, after 48 hours, in its combat capability and would be subject to destruction.

Unlike the German 1st Division, the light infantry division is tailored to focus primarily on light infantry operations.⁵² It is organized with: (See organizational diagram, Appendix E, Figure 1) -

- 9 light infantry battalions
- 1 engineer battalion
- 1 military police company
- 1 military intelligence battalion
- 1 band company
- 1 signal battalion
- 1 air defense artillery battalion
- 1 engineer battalion
- Divarty headquarters with -
 - 3 105mm (towed) artillery battalions
 - 1 155mm (towed) artillery battery
- combat aviation brigade with -
 - 1 combat aviation battalion
 - 1 attack helicopter battalion
 - 1 reconnaissance squadron

Significant differences between the light division of the 1940s and the light division of today are the heavy artillery assets and the combat aviation brigade. The battalion is a very austere force. It consists of: (See organizational diagram, Appendix E, Figure 2) -

- headquarters company consisting of a support platoon, medical platoon, mortar platoon, anti-tank platoon,

scout platoon, and signal platoon.

-3 light infantry companies with 3 platoons (3 squads of nine men each), a mortar section and an anti-armor section.

The total strength of the battalion is 559 light fighters. The weapon density is:

- 502 M16A2 rifles
- 18 M60 light machine guns (2 ea per platoon)
- 18 medium antitank weapons -dragons (6 gunners per company)
- 4 heavy antitank weapons -TOWs
- 6 60mm light weight company mortars (2 per company)
- 4 81mm mortars

The battalion only has 36 5/4 ton high mobility, multipurpose wheeled vehicles (HMMWVs) and 3 1/4 ton trucks. The infantry companies are provided one HMMWV from battalion assets, based on supply needs. The assault elements of the battalion can be moved by airmobile assets of the division in one lift.⁵³

The training begins for the soldier at his one station unit training (OSUT) site. At OSUT, he receives basic and advanced individual training for his particular MOS. Upon arrival at his duty post, the soldier joins his unit and focuses on sustainment and continuation of individual and collective training. All soldiers participate in a Light Fighters Course which focuses on changing the mindset of the

soldier and qualifies him as a light fighter. The course consists of training on land navigation, rappelling, physical endurance, small unit operations, and selected individual soldier skills. The mountaineering training is limited to rappelling, basic knots, and rope bridges. Periodically, selected units deploy to Panama and Alaska and conduct amphibious training with the Marines. There are a number of Ranger-required positions (two out of three squad leader, platoon sergeant, and platoon leader positions per company), in the line companies. Leaders attend a Light Leaders Course which centers on leadership and small unit operations. The majority of the training focuses on the unit collective Mission Essential Task Lists, emphasizing small unit operations and physical endurance.

The 3rd Battalion, 172d Infantry (Mountain)

The mission, organization, equipment and training of the 3rd Battalion, 172d Infantry (Mountain) when compared to the light infantry battalion has some similar and diverse characteristics. The development of the mountain infantry concept is focused around light infantry operations. The key difference between the two is the area of operational capability.

The proponents of the mountain infantry concept state that the light infantry units cannot operate successfully in

the medium to high mountain environments due to inadequate organization, equipment and training. The 10th Mountain Division of World War II was trained to operate in the high mountains, but did not do so in Italy. The proponents of mountain units further justify their position by citing historical battles, portraying the efforts of other nations in sustaining the capability to fight in the mountains.⁵⁴

The low mountains require only a limited knowledge of basic mountaineering skills while the medium to high mountains require advanced mountaineering skill. This was the basis for the foundation of the 3rd Battalion, 172d Infantry (Mountain). The battalion's mission is to conduct limited offensive and defensive operations in mountainous terrain, under all climatic conditions, independently or in conjunction with supported units and to provide technical assistance and advice. The reason for the term "limited" is to key the higher echelons that the mountaineering expertise is not an asset that should be wasted as the World War I Italian leaders did when conducting frontal assaults with the elite Alpini units.

The battalion has all of the necessary firepower for independent operations - indirect fire support, antiarmor assets, air defense weapons, a significant amount of automatic weapons and sniper rifles. It can train supported units in basic mountaineering and cold weather skills, and enhance their mobility. A unique feature is an organic

engineer platoon. Key to the battalion design is its ability to sustain itself based on a cellular support concept. It has additional combat service support personnel to include medics, signal and supply men, and mechanics. The medical assets enable casualties to be stabilized, treated upfront and expeditiously evacuated.

The advanced mountaineering skills of the battalion enable a commander to conduct free and party climbing similar to that of the 10th Mountain Division on Riva Ridge in World War II during Operation Encore. Rope installations such as rope bridges, fixed ropes, vertical hauling lines, and suspension traverses assist the commander in attacking from an unexpected direction while sustaining the force. Unique skills allow the mountaineers to operate in glaciated terrain and high angle snow and ice. Soldiers are educated in "snow science"; a term used for the study of classifications of snow, snow layers and ice formations, characteristics of avalanches and glaciers, procedures for avalanche and crevasse rescues and terrain and weather factors influencing slope stability.⁵⁵ This knowledge enables the commander to use the characteristics of mountainous terrain to his advantage.

The battalion can also conduct high altitude operations and maintain the requisite base of knowledge for skills in acclimatization. It can use the swiftness of ski mobility in the higher elevations to bypass enemy positions and

conduct extensive reconnaissance behind and above enemy lines. The uniqueness of vertical ascent/descent skills can add a new dimension to a commander's capabilities and can be considered a combat multiplier.

Since there is no division support base to augment the battalion, as with the light infantry battalion, the 3-172d Infantry (Mountain) has some limitations. Normally, fire support teams (FIST) come from the division artillery (DIVARTY). They maintain a habitual support relationship with infantry/armor units. The mountain battalion, when augmented with artillery, requires FIST personnel at the unit level to assist in calls for fire. The battalion does not have a U.S. Air Force tactical air control party nor does it have air assets for airmobile operations.

The battalion is organized as follows: (See organizational diagram, Appendix F, Figure 1) -

-a headquarters company consisting of:

- | | |
|-------------------------|-------------------------|
| -support platoon | -two anti-tank platoons |
| -communications platoon | -air defense section |
| -engineer platoon | -mortar platoon |
| -medical platoon | -scout platoon |

-three mountain infantry companies with:

- three line platoons with three 11 man squads
- mortar platoon
- sniper section

The weapon density of the battalion is:

- 684 M16A1 rifles
- 9 .50 cal machine guns (vehicle/ground mount capability)
- 27 M60 machine guns (3 per platoon)
- 18 medium antitank weapons - dragons
- 9 60mm light weight company mortars (3 per company)
- 6 81mm mortars
- 5 man portable air defense weapons - Stingers

The total strength of the battalion is 776 mountaineers.

The vehicle assets are much greater than those of the light battalion. There are 32 1-1/4 ton trucks, 13 2-1/2 ton trucks, and 24 1/4 ton trucks versus the 36 HMMVWs and 3 1/4 trucks found in the light battalion.

The soldiers of the 3-172d Infantry (Mountain) undergo the same basic and advanced training as the light fighters. Since the battalion is a National Guard unit, time is a critical factor. The progression of training has three phases - infantry, mountain infantry and then advanced mountaineering. The battalion sends their soldiers to an intense, hands-on four weeks of mountain warfare training conducted by the Army National Guard Mountain Warfare School for the second phase of training. The training is divided into two periods, two weeks in the summer and two in the winter. The program of instruction covers the following subjects:

-15 hours navigation in the mountains (use of the altimeter)

-90 hours on mountain operations (rope work, safety, rappelling, artificial anchors, free and party climbing, heavy load ascents, fixed ropes, vertical hauling lines, evacuations, rope bridges, etc.

-33.5 hours of mountain warfare tactics (preparation for operations, platoon assault climbing)

-16 hours on how to sustain in a mountain environment (maintenance of weapons, mountaineering equipment, resupply operations, communications and use of night vision goggles)⁹⁴

The battalion training is focused at squad and platoon level incorporating mountaineering skills with the normal individual and collective training. For example, a climb or rappel would be incorporated into a squad patrol or, during winter, the battalion would move via skis to an objective area. The battalion conducts its weekend drills and annual training periods in the Green Mountains of Vermont and deploys to other mountain training areas such as Quebec, Canada. Twice a year a force of up to platoon-size deploys to Italy and conducts training with the Italian Alpini mountaineers for two weeks of climbing and mountain operations in the rugged Dolomite Mountains. Soldiers have trained at the Austrian Mountain School, where the elite Austrian Alpine guides are trained. This is only a small

group, but it represents the transition from the mountain infantryman to the advanced mountaineer. The entire battalion will deploy to Italy in 1992 to conduct its annual training.²⁷

This concludes the overview of the mission, organization, capabilities/limitations and training of the German "Gebirgsjagerbrigade", the light infantry battalion and the 3-172d Infantry (Mountain). The differences between the three units will now be discussed. First, each unit will be contrasted in respect to the numbers of personnel and equipment in selected areas. Then, they will be contrasted through the use of the dynamics of combat power.

Contrast of Personnel and Equipment Items

Several of the major lessons learned from the two historical analyses centered around the number of personnel in the combat, combat support and combat service support units and different items of equipment such as vehicles, mortars, and crew served weapons. The differences are listed and then contrasted as they pertain to the dynamics of combat power. The following chart reflects the differences between the three units.

	<u>German</u>	<u>U.S. Light</u>	<u>U.S. Mountain</u>
<u># of Soldiers</u>			
Battalion	877	559	776
Line Company	173	130	160
Platoon	40	34	40
Squad	11	9	11
Engineers	0	0	27
Mortarmen	30	44	66
Field Gun (20mm)	14	0	0
Hvy Anti-tank	0	19	0
Med Anti-tank	42	39	60
Air Defense	0	0	14
Snipers	96	0	18
Scouts	20	19	19
Medical (91)	13	26	35
Signal (31)	35	20	31
Supply (76)	32	14	20
Maintenance (63)	30	1	11
<u>Equipment</u>			
Anti-tank wpns	21	22	18
Mortars	12	10	15
Air Defense	6	0	5
Machine guns	27	18	36
Vehicles	171	39	70
Mountaineering	yes	no	yes

A quick analysis shows the significant differences in combat service and combat service support personnel and in firepower and mobility assets.

Contrast Using the Dynamics of Combat Power

The capabilities of a unit based on its organization and training are molded into the dynamics of combat power. In short, "combat power" is the unit's ability to dominate the battlefield through the use of maneuver, firepower, protection and aggressive leadership. Leaders must convert the capability of the force, the resources available, and the tactical situation, into an opportunity to knock the enemy off balance and deliver the crushing blow at the critical time and place. Troops fighting in the mountains have the potential of attacking from an unexpected direction, achieving tactical surprise. The key, though, is the unit's adroitness in using the requisite skills and equipment to take advantage of the terrain.

"Maneuver" is defined as the unit's ability "...to secure and retain positional advantage. Successful tactical maneuver depends on skillful movement along indirect approaches supported by direct and indirect fires."⁵⁸ In order to maneuver, FM 100-5 states that the unit must have ground and air mobility. Effective command and control, solid organizations, agile operational procedures, and

dependable logistical support are also key elements of maneuver.⁵⁹ The German mountain brigade possesses the capability to move its personnel and equipment in one load with its organic assets. The light infantry battalion cannot move itself and must be heavily augmented to do so. The 3-172d Infantry (Mountain) can move 2/3 of its organic equipment and personnel. All three can be airmobiled or airlifted - the division organic air assets can move the light battalion assault elements. Maneuverability also includes ground movement. This includes movement by foot, snowshoe, skis, climbing and descending.

Based on the training and mountaineering equipment, the Germans are rated first in their ability to move along the indirect approach; the 3-172d Infantry (Mountain) is rated a close second. The major difference is training -- due to the short time available for the National Guard mountaineers. The light infantry battalion can maneuver in the low to medium mountains with additional training but must be augmented with snowshoes, ropes, pitons, chocks, pulleys and skis. The Germans and the 3-172d Infantry (Mountain) also have over-the-snow vehicles such as Small Unit Support Vehicles and snow machines. Both have the appropriate winter equipment, such as tents, stoves and ahkios to survive in the cold weather. In the light battalion limitations statement, FM 7-72 indicates that the tactical mobility of the unit is limited due to the number

of vehicles.⁶⁰ The key advantage to the light battalion is its strategic and operational mobility due to its small size.

Edward Luttwak states that the infantry divisions of World War II had a "flatland force structure" and mind set which was a major factor in the slow, costly progress during the Italian campaign. The dramatic results of the 10th Mountain Division decisively showed the advantage of a skilled mountain organization.⁶¹ Critics say the Germans were weak, replacing units, and withdrawing forces. But the fact remains that the 10th Mountain Division was able to gain positional advantage using an indirect approach supported by direct and indirect fire, knocking the enemy off balance, thus achieving surprise and setting the stage for a successful spring offensive.

"Firepower" is the necessary destructive force required to destroy the enemy. This term includes the amount of a unit's organic firepower, its ability to suppress and disrupt the enemy, and the integration of firepower with maneuver. When firepower is used separate from maneuver, it is focused on uncommitted enemy forces in order to destroy, disrupt, and delay the enemy. Knowledge in employment of weapon systems, integration of fires, and coordination of fires are key traits combat leaders must master.⁶²

Examining the organic fire support assets, the 3-172d Infantry (Mountain) is equipped the best due to its numbers

of machine guns, mortars and air defense missiles. The .50 caliber machine guns were included in the TOE for their air defense capability and for rear area protection. The supply/support trains will be isolated on the battlefield in the lower parts of the mountains, away from the combat forces. The machine guns are vehicle-mounted to better protect the lines of communication and have tripods for fixed emplacement. Under special circumstances, they can be employed in support of front line operations.

A major lesson learned during World War II was the necessity for mortar fires versus artillery fires. Due to the trajectory problems, deadspace, limited road networks and areas for positioning, artillery was not as responsive in the mountains as desired. The mortars can be positioned/displaced closer and fired into valleys and defiles. They are also more responsive when organic. The 3-172d Infantry (Mountain), at the company level, has three 60mm mortars with additional ammunition bearers and a fire direction center. The battalion 81mm mortars consist of six systems, has additional ammunition bearers and also a split fire direction center capability. Vehicles are provided for squad mobility as well as packboards and slings for manpack.

The German mountain infantry has six 120mm self-propelled mortars and six field guns. While the lethality of the mortar rounds may be a little better in comparison to the 3-172d Infantry (Mountain), their maneuverability is

restricted thereby limiting the responsiveness. The light infantry battalion has two 60mm mortars at company level but does not have an FDC capability or additional ammunition bearers. The four 81mm mortars at the battalion level have a limited split FDC capability and vehicles for mobility.

The 3-172d Infantry (Mountain) has a man portable, air defense weapon section (Stinger) consisting of five weapon systems plus vehicle mobility. The .50 caliber machine guns plus the 27 M60s can also be used for air defense. The field guns in the German unit, plus organic machine guns, can be used for air defense. The light infantry does not have any air defense weapons except for the light M60 machine guns. The 3-172d Infantry (Mountain) has the advantage in air defense firepower capability.

The sheer number of soldiers available is also a factor in the availability of firepower. The Germans have more personnel than the other two American units. When analyzing the support personnel figures, it is obvious that units which maintain more fighters on the front line due to TOE supported combat support and combat service support personnel have a distinct firepower advantage. Once again, the German force has a greater advantage. The light infantry concept design actually reduces the number of non-combat soldiers.

All three units have a sniper capability. The Germans have 96 sniper rifles, with one third night vision

capability; the 3-172d has 18 M21 rifles with scopes; and the light infantry has a designated marksman per squad (18) who use the standard M16A2 rifle.

The additional ammunition bearers at the squad level are a significant advantage for the 3-172d Infantry (Mountain) due to increased ammunition transport requirement and, as the terrain and enemy take their toll, soldier availability to continue the fight. The other elements of firepower such as training, integration of fires, and coordination are all equal among the three units. Training time may be the differentiating factor when referring to the National Guard battalion, but the battalion has the structural capability to be on a par with the other two units. Possessing a greater firepower capability is useless without the ability to protect the force.

The next element of the dynamics of combat power is protection. How is the force protected? It is done by conserving its fighting potential in order to maneuver and employ firepower at the critical time and place. There are two ways to do this. The first is to deter the enemy from locating and destroying the friendly force. This is done with proper security, use of camouflage, cover and concealment, air defense, ability to disperse, and the units capability to counter enemy firepower and maneuver.

All three units have the ability to secure themselves. Each has a scout capability. The Germans have an advantage

due to the higher level of training of the alpine platoon in the company headquarters. These soldiers can better position themselves in the rugged terrain to provide early warning and gather intelligence information. Both the Germans and 3-172d Infantry (Mountain) have an advantage in numbers, which would allow these units to have a greater patrolling and LP/OP capability with less degradation of the squads who must patrol, provide guards, man the line, sleep, and maintain equipment.

In the area of cover, camouflage and concealment, the 3-172d Infantry (Mountain) has the advantage with its organic engineers. Their expertise in demolitions, obstacles, terrain analysis and fortifications provide a capability not organic within the other two units. The light infantry battalion has the advantage of a reduced signature based on the size of its force (less vehicles, equipment and soldiers to conceal). The other two units can disperse their assets better due to their mobility. The light infantry battalion has a smaller military intelligence section which limits its capability in terrain analysis thereby affecting the use of the terrain properly.

Air defense, maneuver and firepower, the remaining key elements, have already been discussed. The second part of protection is the ability of the unit to maintain soldiers' health, welfare and morale. The force structure and equipment assets allow a commander to take care of his

soldiers' needs and to prevent the soldier from being exposed to enervating conditions. What are soldier needs and what does it take to weaken his morale?

Soldiers have basic needs but leaders and staffs at times fail to realize this. LTC John Schmelzer, in his after action report on mountain warfare during World War II, states that "morale of the troops in mountain operations in winter depends entirely upon minimum physical necessities such as sleeping bags, warm footwear, and hot food. If lacking, they are a greater enemy than the Germans."⁶³ This basically is simply sustaining the force. Protecting the force involves securing the means to sustain it. This has a direct impact on the preservation, health, welfare and morale of the unit.

Sustainment focuses on combat support and combat service support capabilities. The breakdown of personnel to maintain these functions indicates that the Germans and 3-172d Infantry (Mountain) are better organized to accomplish this in a mountain environment. A lesson learned in World War II that verifies this premise was that the more support personnel a unit has, the fewer fighters that must be pulled off the line to support unit requirements. Granted, the light infantry can be augmented, but the light infantry concept of support is area based rather cellular. In the mountains, the units will be operating in compartmented terrain, independently with long lines of

communication. Area support is not conducive to mountain operations. Units must be self-supporting. By contrast, the concept design for the light infantry states that units need not be self-sustaining.⁶⁴

The two mountain units possess the means to stabilize, evacuate and treat casualties in remote areas. The mountaineers have an additional 10 medics, plus a nurse. All three units have a doctor and physician's assistant. The mountain units have evacuation assets at the company level that are consolidated at battalion in the light infantry. Quality medical care is a significant factor in maintaining the health, welfare and morale of soldiers.

Communications personnel were a definite shortfall in the World War II units fighting in the mountains. Units had to supplement their communication platoons with infantry to lay the tremendous amounts of wire and to act as messengers. The mountain units have 11 additional soldiers, plus redundant communication equipment, to allow vehicle and manpack of radios to be used simultaneously. Over-the-snow vehicles are available for laying/retrieving wire in the mountain units. The additional mountaineering skills allow the communication personnel to take shorter, more difficult, routes and position better relay sites. The light battalion has motorcycles for message services but no designated operators. There are wire teams for each company in the two mountain units but none in the light infantry. The

infantrymen must be taken off the line to lay wire. This limits the ability of a commander to protect his force.

Maintenance, expeditious repair and supply are key factors in a leader's ability to sustain and protect the force. The differences in these areas are obvious from the listing of personnel earlier. The light infantry does not have sufficient organic assets to maintain its equipment. There are twice as many supply/maintenance personnel in the mountain units. The tremendous toll that the mountainous environment takes on equipment and the large amounts of supplies needed to sustain the force are crucial to the success of a battle.

The number of men in a squad must be considered when analyzing sustainment. The eleven men in the mountain units can carry more equipment and rotate the loads easier. Conversely, less men means less equipment, but as casualties mount in a battle, more men available wins the argument. When it is necessary to pull men off the line to be used as litter bearers or load bearers, more men are left up front with the eleven man squad.

The mountain units have organic technical and cold weather equipment -- key for the protection of soldiers from debilitating conditions. The light infantry would have to conduct a considerable amount of training with augmented equipment in a mountainous environment to be on a par with the two mountain units. The units in World War II suffered

heavy casualties due to inadequate equipment and lack of proper training. Such specialized equipment also has to be readily available for immediate resupply in the support system. The weather and terrain are totally unforgiving and soldiers will suffer if the resupply system is not responsive.

Maneuver, firepower and protection cannot be coordinated without the most critical element of combat power - leadership. The leader will decide how to best integrate these dynamic principles in order to defeat the enemy. Experience through training, studying and preparation for mountain combat is essential to the leader who is going to take on the challenges of mountain operations. All three units possess the leadership potential to accomplish the mission in the rugged terrain. The light infantry battalion has an advantage over the other units due to its smaller leader-to-led ratio. It has the same TOE leadership positions as the others but has smaller squads, platoons, and companies. The distinction of being a mountain or light infantry soldier assists the leadership in motivating their men.

The communication shortfalls have already been discussed and this will affect the leader's ability to command and control the light infantry battalion. The mobility shortfalls come in to play when leaders try to control compartmented actions. Protection of the command

and control equipment will also influence the commander's ability to maintain continuous supervision over the battle.

The skills required to lead men are demanding in any combat situation. The physical hardships, terrain, weather, isolation, limited supplies, problems with medical evacuations, command and control limitations, and the enemy resistance, all combine to make a strong, aggressive leader paramount in mountain operations. Leaders must set the example and suffer with their soldiers through the exact same exhaustive conditions. Many times during World War II, leaders and staff did not have an appreciation for the condition of the battlefield and their soldiers. The leaders must be hard and demanding, leading their soldiers all the way to the top of the objective. In order to accomplish the mission, the leader must combine maneuver, firepower and protection to counter the enemy and win in the mountains.

This concludes the comparison/contrast of the three units. The dynamics of combat power decide the outcome of battles and the analysis of the three units shows the strengths and weaknesses of each organization. The final chapter will determine if there is a need for mountain units in the United States Army force structure by drawing conclusions from the historical analysis, current deployment areas, forces available and the results of the analysis using the dynamics of combat power.

CHAPTER 4

CONCLUSION

This chapter combines the lessons learned from the historical analysis, and the organization, and current capabilities of the light infantry battalion and the 3-172d Infantry (Mountain) to wage war in a mountain environment. The results will show whether there is a need for mountain infantry in the United States Army force structure. Alternate employment options of mountain trained personnel will also be discussed. The chapter will conclude with recommendations for further research in areas not covered by this paper.

George Santayana stated that "those who cannot remember the past are condemned to repeat it."⁶⁵ The lessons learned from the combat action of the 88th Infantry Division and the 10th Mountain Division are key in considering the employment of forces in the mountains. These lessons are consolidated into three areas: personnel/organization; training/tactics; and logistics/sustainment.

Personnel/Organization

The principle of fighting in the mountains with mountaineers from the European philosophy was a fundamental consideration for the design of the 10th Mountain Division of 1942 and the 3rd Battalion, 172d Infantry (Mountain). The backwoodsmen, trappers, skiers, climbers and Indians of the 10th Mountain Division proved themselves in combat. The organizers of the 3-172d Infantry (Mountain) considered this when the unit was stationed in New England. Both units possess the ability to maneuver from an unexpected direction with their technical mountaineering skills, whereas the 88th Infantry Division and the light infantry battalion do not.

The Fifth Army commanders and staff realized that it was harder to protect the force in the mountains because of the need for more combat service and combat service support personnel in the force structure. The 10th Mountain Division increased the personnel spaces due to lessons learned in training and reading combat after action reports, but it still experienced the problem of pulling front line troops for sustainment operations.

A major point of contention for the proponents of the 3-172d Infantry (Mountain) centers around eleven man squads versus nine man squads. The Army of Excellence force design concept continually tries to save spaces by reducing the squads and the additional medical, communication, supply,

maintenance, mortarmen, air defense, snipers and engineer personnel in the battalion organization. The force designers should examine the after action reports of wars past that justify the additional positions before reducing critical manpower spaces.

These additional positions are not present in the light infantry design and will severely hamper the light infantry battalion's ability to maintain its fighting force on the front lines. Commanders will be faced with putting two platoons on the front lines while using the third as support personnel as did the 88th Infantry Division.

As attrition, physical exhaustion and extended lines of communication take their toll, light infantry battalions will become reinforced company size organizations. Front lines will, at times, only be outposted due to casualties, resupply, maintenance, patrolling, manning observation posts, sleep, messengers, and the numerous other details that require soldiers. The isolation of units operating in the mountains will cause the replacement system to be slow and cumbersome.

The addition of snipers to the 3-172d Infantry (Mountain) matches the comments in the World War II after action reports on the inability of soldiers to shoot at what was in their line of vision. The enemy observation posts and patrols could be spotted at higher elevations, but soldiers could not engage them with the standard issue

weapon. A well-placed sniper can delay an entire battalion in a mountain pass. The light infantry battalions designate one marksman in each squad, but when there are only nine men, organizing sniper teams degrades the firepower and maneuver capability of a squad.

The light infantry battalion is organized to reduce non-combat soldiers to a minimum and operate without redundant systems. This conflicts with the requirements for operating in the mountains. The "solution" to all shortcomings of the light infantry is that it can be augmented to perform missions beyond its capabilities. Augmentation normally means additional artillery, trucks, antiarmor weapons, and air defense weapons. The augmentation of four or five medics, ten signal men, two infantrymen per squad, additional supply men, or mechanics to each battalion causes a major retraining and reorganization problem for the commander and staff of the light battalion. Normally, augmentation should be done with units, not fragments from different units. Bluntly stated, light infantry battalions do not have the assigned personnel nor organization required to operate in mountainous terrain.

Training/Tactics

The light infantry battalion has the mission to operate in jungle, desert, mountain, urban terrain and restricted

terrain in general. The infantryman must master at least 160 basic skills plus function as a member of a team in the execution of collective skills. When environmental or terrain specific training is included, the level of proficiency and the availability of training time compete against each other. Therefore, only basic survival skills and rudimentary knowledge in terrain-specific training can be taught. The 88th Infantry Division had to learn its mountaineering skills in the theater of operation and was taught only basic fundamentals. The rest of the skills had to be acquired on the battlefield.

The 10th Mountain Division was highly trained in mountain operations. It was then sent to the flatlands of Texas to determine if it could function out of the mountains. The division proved that the mountain environment trained soldiers well for other areas of operation. The German High Command in World War II recognized this fact. Leaders, such as Rommel, attributed their military successes to the fundamentals of combat operations they learned while operating in the mountains. The reverse is not true for units trained in desert or jungle operations. Many of the technical skills taught in mountaineering can be applied directly to operations in urban terrain.

The 88th Division learned that soldiers needed to be trained in technical mountaineering skills such as

establishing climbing lanes, predicting weather, and guiding units over mountains. The 10th Mountain Division successfully demonstrated these capabilities. Today's light infantry battalion would have to go through considerable training to use the mountain specific equipment organic to the 3-172d Infantry (Mountain).

The 88th Infantry Division identified a need for ski proficient soldiers; the 10th Mountain Division had them but only skied once. If the mountaineers had been employed in the higher elevations, perhaps the extensive amount of time they spent in ski training would have paid off. German mountain units, as well as the Italians, are very proficient in cross country skiing. The 3-172d Infantry (Mountain) is outfitted with the latest civilian cross country/downhill combination skis, boots and poles. The light infantry battalion would have to undergo considerable training in order to move as a unit on skis.

The tough training that the 10th Mountain Division underwent in Colorado trained the leaders in the minute details that can make the difference between success or failure. Simple rules on how to dress for movements, what to pack, what to eat, how to prepare meals and how to protect a unit from the elements require practice in the mountains. Leaders should know about the effects of cold weather on the burn rate of propellant charges; about weapons zeroed in temperate climates that fire low in cold

climates; that VT fuze type ammunition is better in snow-covered terrain; and that their machine gun positions will be revealed by the fog that rises above the position when the weapon fires. The light infantry battalion will not know how to react to avalanches, rock falls, and mountain sickness. Leaders must know the endurance level of their soldiers and who they can depend on when the unit is totally exhausted. Unit SOPs must be developed in peacetime or the soldiers will only be reacting to situations as they are encountered. Granted, a light infantry unit will gradually adjust to operating in a certain environment, but to quote Sun Tzu:

To rely on rustics and not prepare is the greatest of crimes; to be prepared beforehand for any contingency is the greatest of virtues.**

Staffs also must be aware of the tactical differences of mountain operations. Movement planning, weapon employment considerations, communication problems, usage rates of supplies, effects of weather and terrain on the soldier, and the use of terrain are a few of the skills the Blue Devils learned the hard way, the 10th Mountain Division learned in training and the 3-172d Infantry (Mountain) is learning now.

Tactical considerations on employment of artillery, how to position overwatching forces in narrow defiles, the staggering of antiarmor assets through a valley, constructing obstacles with snow and ice, establishing

communication relay sites, and maneuvering forces in restrictive terrain are all techniques that need to be practiced. The 3-172d Infantry (Mountain) incorporates mountain specific events into its ARTEPs to attain proficiency at these tasks. During the battalion's 1987 Annual Training period, it deployed to Quebec, Canada and conducted a combined force ARTEP with an Italian Alpini Mountain unit and a Canadian unit. The training focused on over-the-snow mobility and the ARTEP tasks of defense, delay, and movement to contact. The OPFOR was a company of the 10th Mountain Division (Light) from Ft. Drum. The significant difference between the two units was the skiing capability and the technical mountaineering skills of the 3-172d Infantry (Mountain). The lessons learned during this training exercise will save lives if the unit is deployed in a future conflict.

There are Army schools and POIs available to teach mountaineering skills. The Army National Guard Mountaineering School (ARNGMS) in Vermont and the Northern Warfare Training Center (NWTC) in Alaska are the two major Army institutions. The Ranger Course and Special Forces Course both teach basic mountaineering skills. Mountain skills are perishable and must continually be practiced to maintain sufficient expertise. The light infantry battalion could be sent to these schools to learn mountaineering skills, but as stated earlier, it takes actual, sustained

operations in the mountains in order to become proficient and combat ready.

Logistics/Sustainment

The logistics system must be set up to supply units operating in the mountains. Pitons, modified D style, and pear-shape snaplinks, piton hammers, crampons, ice screws, jumars, "figure-8" descenders, ascenders, nylon ropes, ice picks, pulleys, climbing harnesses, altimeters, goggles, gaitors, sunglasses, snowshoes, Dynastar Yette 180cm skis with downhill/cross country Silveretta bindings and Kassinger ski boots are a few of the mountain specific equipment items that fill the supply rooms of the 3-172d Infantry (Mountain). The mountain equipment a light infantry battalion possesses consists only of military 120ft ropes, sling ropes and carabiners.

The current 10 man tents and cold weather sleeping bags are not satisfactory for mountain operations. The soldier's load is under constant evaluation. Operations in the mountains demand lighter and more efficient equipment. The 88th Infantry Division exhausted its soldiers with the loads they were required to carry. The 10th Mountain Division had lighter and more efficient civilian cold weather equipment which aided the movement of the unit.

Soldier morale and survival depend on basic necessities which the supply system must provide in a timely manner. Theater supply stocks should maintain adequate levels of mountaineering equipment. As stated earlier, the lack of adequate supplies can be a greater adversary than the actual enemy soldiers. Units will operate in compartmented terrain relying on extended lines of communication. Dedicated assets will have to support each unit. The area support concept of the light infantry division will severely hamper sustainment operations of units not only in contact but also units merely trying to survive in the rugged terrain.

Other logistic considerations include learning how to operate and maintain equipment in cold weather. Equipment breakage increases, so stockage levels of Class IX need to be increased. Ammunition can be materially affected by cold weather and condensation freezes in weapons. Batteries will have to be overstocked due to the fast rate of usage in cold weather.

The organization and limited assets of the light infantry battalion do not meet the logistical demands of a mountain environment as proven by the 88th Infantry Division and the Fifth Army. However, the ability of the commander to protect his force is probably the key argument against the use of light infantry in medium to high mountains. The organization and capabilities of the 3-172d Infantry (Mountain) can be tied to the specific lessons learned from

World War II in logistic and sustainment operations. The additional support personnel, specific mountaineering equipment, the vehicles and snow machines, and the cellular support concept all are tailored for mountain operations.

Alternate Methods of Employment

If the war drums echo in the mountains tomorrow, what are other means available for the United States to answer the call? The 3-172d Infantry (Mountain) could be directed to send one company to at least three light divisions as a training cell. The company could also be employed as the lead element for a brigade or battalion and establish the necessary mountaineering installations to assist the passage of the main body. The battalion staff could be integrated into the division staffs to provide assistance and advice on mountain operations. The ARNGMS and the NWTC could be sent to the operational region and design a school based on the terrain in the theatre. The battalion or the schools could remain stateside and train units readying for deployment.

In conclusion, when America has to fight in the mountains of the Far East, Middle East, the Americas, Europe, Africa or South/Southeast Asia, the present force that is tasked to respond is the light infantry division. The Italian campaign proved that the United States Army had

serious shortfalls in its mountain combat capabilities, and it took a trained mountaineering unit to break through to continue the fight. When the lessons learned from World War II are compared to the organization of the 3-172d Infantry (Mountain), it appears that they were used as a guide to form the battalion.

The "flatland attitude" of the forces readied for World War II has once again infested the thinking process of the U.S. Army. As LTC Marcus L. Powell, tactics instructor at the United States Army Command and General Staff College, aptly states:

...in each new campaign involving operations in mountainous regions, we have had to learn anew how to apply these principles...only after much bitter fighting with heavy losses in personnel, equipment, and prestige.▲7

The active army needs a credible mountain unit that will be able to maneuver from an unexpected direction, taking maximum advantage of its firepower while at the same time protecting itself in order to fight and win in the mountains. The creation of the 3-172d Infantry (Mountain) is a positive step in the right direction, but it cannot be the only resource the United States has to use to conduct mountain operations. The 88th Infantry Division was a fine fighting force, but it was not trained to succeed in mountain warfare. The light infantry battalion, with even less assets, would surely be doomed for failure.

The veterans of the 10th Mountain Division of World War II have officially stated the need for mountain infantry units.* The combat military mountaineering experience has deteriorated in the United States. Countries throughout the world have realized the necessity for maintaining a mountain force. The United States, with its numerous areas of interest, should be developing the finest mountain troops in the world. There is a need for mountain infantry units in the United States Army force structure.

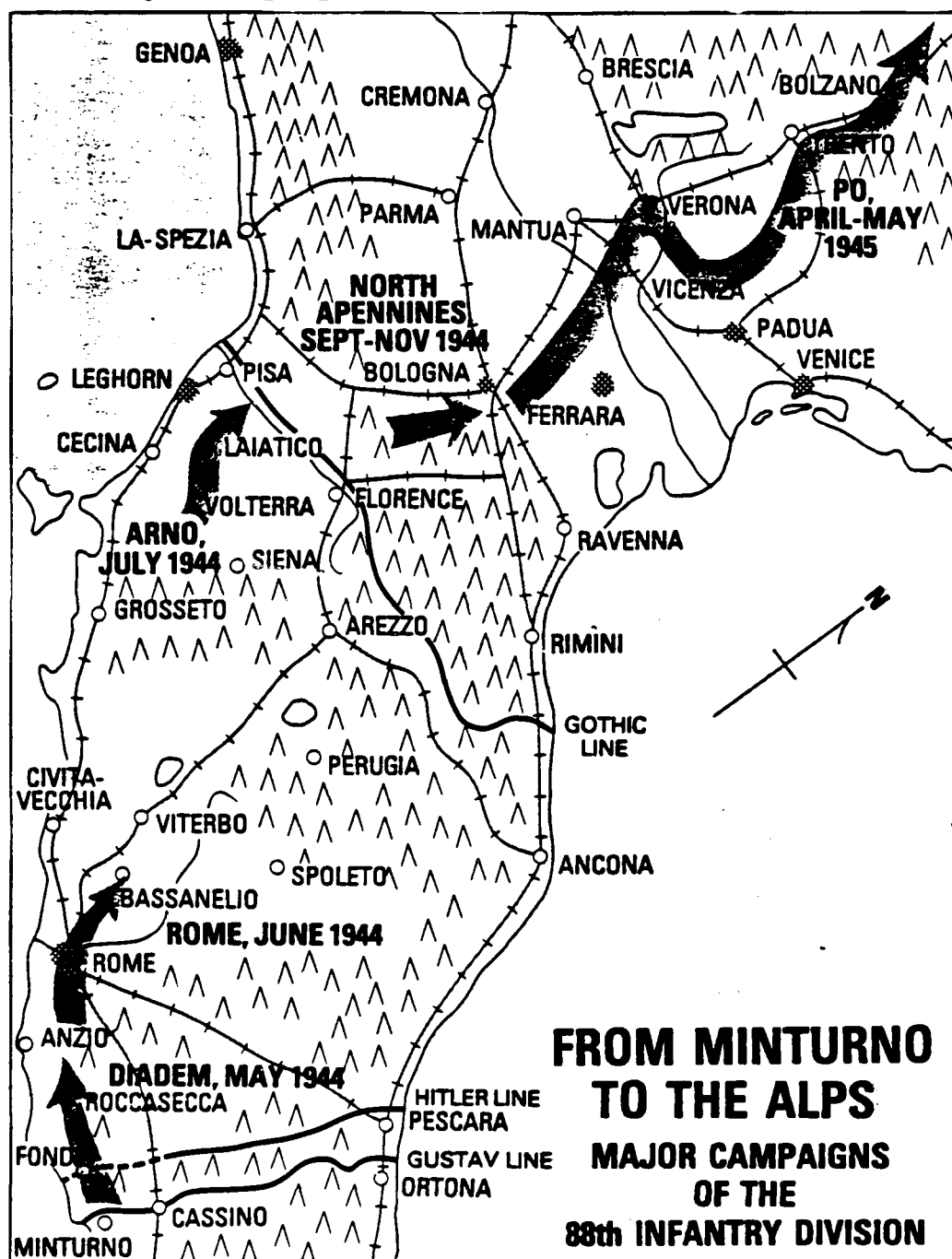
In a national emergency demanding mountain troops, this country would be again unprepared for lack of acclimatized and adequately trained troops...In future wars there will not be time, as we had during World War II, to organize and train mountain troops.*

Areas for Further Research

1. Are the Soviets assessing the need for mountain troops based on their experiences in Afghanistan?
2. Should the United States Army take the step and make the 10th Mountain Division (LI) a true mountain division?
3. How will mountain units be supported in combat? Is current military mountaineering equipment obsolete?
4. Should Army Force Design look at history as validation for force structure?

Appendix A

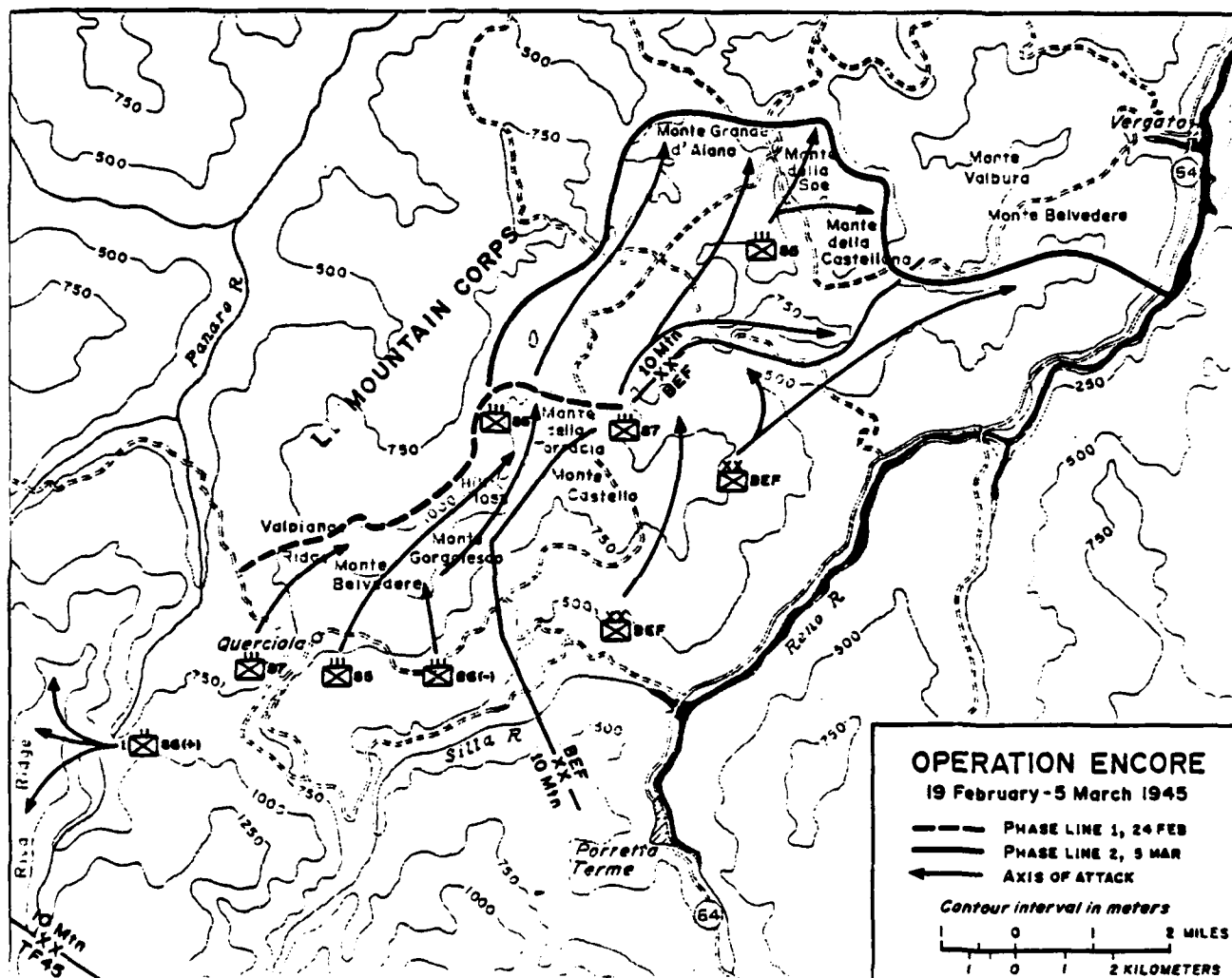
Major Campaigns of the 88th Infantry Division¹



¹ John Sloan Brown, *Draftee Division*, (Lexington: The University Press of Kentucky, 1986), p.142.

Appendix B

10th Mountain Division in Operation Encore²



² Ernest F. Fisher, Jr., The United States Army in World War II: Cassino to the Alps, (Washington D.C., Center for Military History, 1977), p.425.

Appendix C

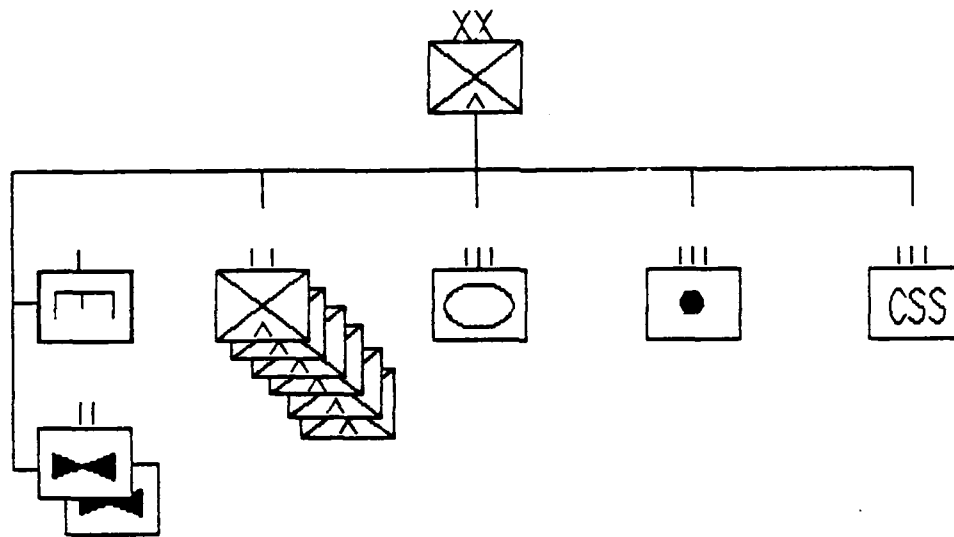


Figure 1. French 27th Mountain Division

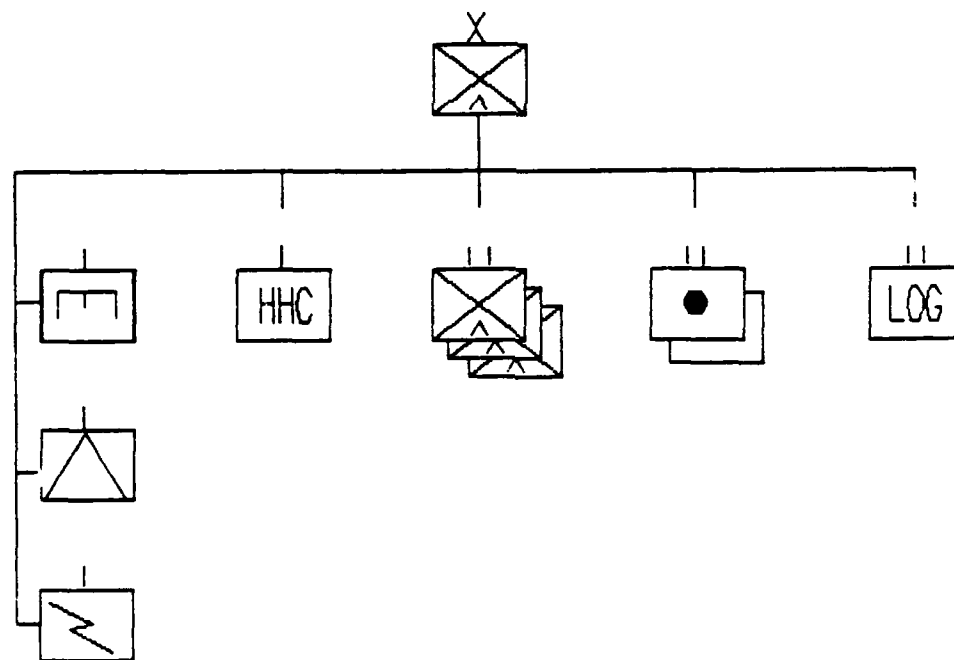


Figure 2: Italian Alpini Brigade

Appendix D

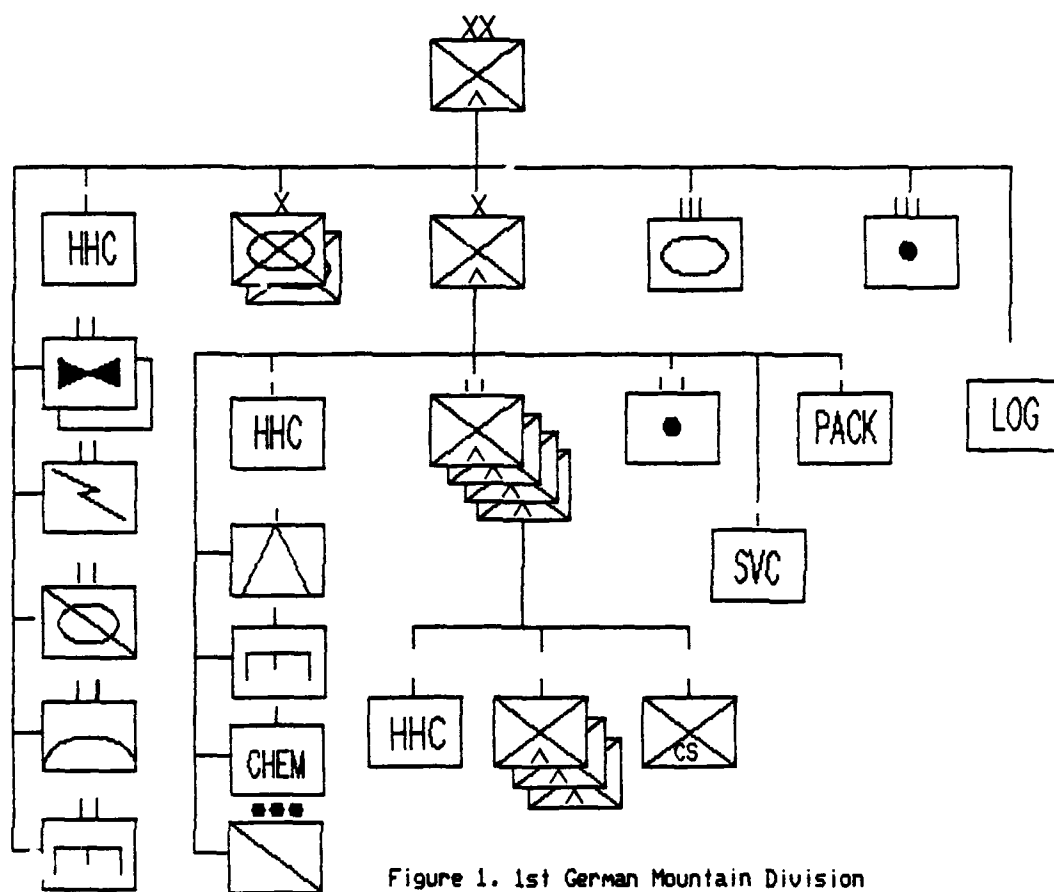


Figure 1. 1st German Mountain Division

Appendix E

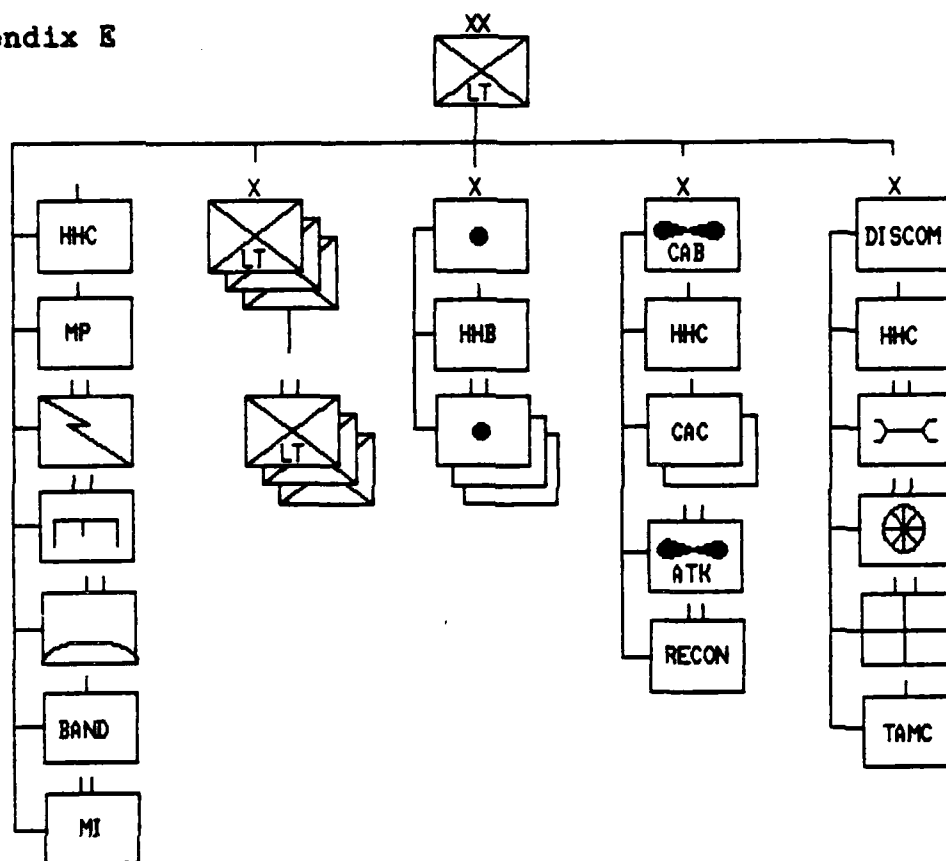


Figure 1. Light Infantry Division

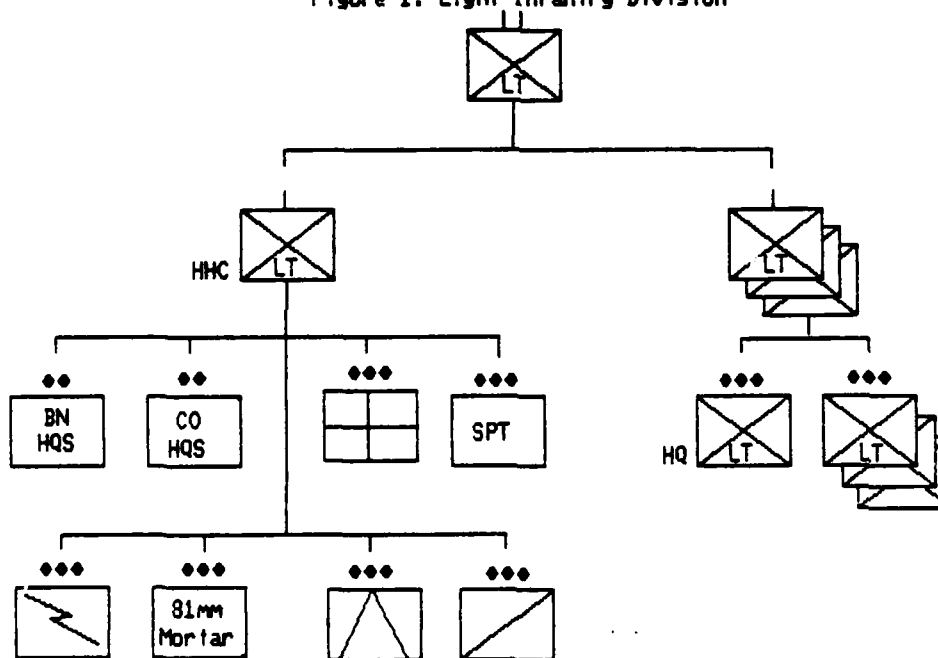


Figure 2. Light Infantry Battalion, Light Infantry Division

Appendix F

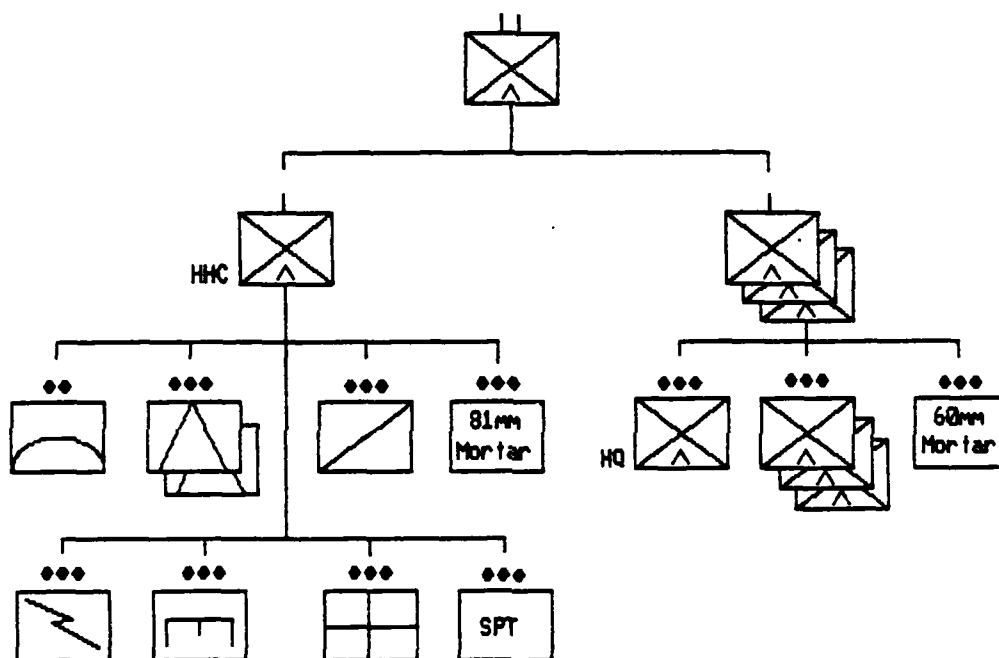


Figure 1. 3-172 Infantry (Mountain)

ENDNOTES

1. BG V.J. Esposito, The West Point Atlas of American Wars, Volume II, (New York, Frederick A. Praeger Publishers, 1959), p.106.
2. LTC Chester G. Starr, From Salerno to the Alps, (Washington D.C., Infantry Journal Press, 1948), p.304.
3. Headquarters, U.S. Fifth Army, Lessons from the Italian Campaign, Training Memo No. 3, (Italy, 1944), pp.7-8.
4. Heinrich Greiner, Tactical Principles of Mountain Warfare, (Italy, Historical Division, SSUSA, 1947), pp.1-2.
5. Dominich Graham, Cassino, (New York, Ballantine Books, Inc., 1970), pp.38-40.
6. Headquarters, U.S. Fifth Army, Lessons from the Italian Campaign, pp.19-22.
7. Ibid., pp.27-29.
8. Ibid., p.67.
9. John P. Delaney, The Blue Devils in Italy, (Washington D.C., Infantry Journal Press, 1947), pp.1-8.
10. Gay Hammerman and Richard G. Sheridan, The 88th Infantry Division in World War II: Factors Responsible for Its Excellence, (Dunn Loring, Historical Evaluation and Research Organization, 1982), p.F-2.
11. Delaney, pp.22-26.
12. Hammerman and Sheridan, p.D-1a.
13. Ibid., p.F-2.
14. Delaney, pp.35-36.
15. Hammerman and Sheridan, p.F-2.
16. Delaney, pp.62-77.
17. Hammerman and Sheridan, pp.B-3a to B-4a.

18. Headquarters, 88th Infantry Division, We Were There from Gruber to the Brenner Pass (Italy, Information and Education Center, 1945), pp.64-74.
19. US Army Military History Institute, History of the 351st Infantry Regiment, (US Army Military History Institute, 1945), pp. 38-39.
20. Headquarters, 88th Infantry Division, We Were There from Gruber to the Brenner Pass, pp.70-74.
21. Delaney, p.126.
22. LTC John F. Schmelzer, Report on Mountain Warfare, (Washington D.C., US Army War College, 1944), pp.1-14.
23. Thomas P. Govan, "History of the Tenth Light Division (Alpine)", (AFG Historical Section, Study No. 28, 1946) p.1-3.
24. George Forty, The Fifth Army at War, (New York, Charles Scribner's Sons, 1980), p.129.
25. Govan, pp.1-11.
26. Albert H. Jackman, "The Tenth Mountain Division, A Successful Experiment," The American Alpine Journal, (1946): p.190.
27. Gen Mark W. Clark, Calculated Risk, (New York, Harper & Brothers Publishers, 1950), p.417.
28. Ernest F. Fisher, Jr. The United States Army in World War II: Cassino to the Alps, (Washington D.C., Center for Military History, 1977), pp.426-432.
29. James Hauptman, The Combat History of the 10th Mountain Division, (1977), pp.16-18.
30. Fisher, pp.432-434.
31. LTG L. K. Truscott, Jr., Command Missions. A Personal Story, (New York, E.P. Dutton and Company, Inc., 1954), pp.487-495.
32. Jackman, pp.191-192.
33. Edward N. Luttwak, "The US Army 10th Mountain Division", (Chevy Chase, TRADOC Contract, 1982), pp.21-27.

34. Maj Melvin E. Richmond, "Combat Operations in Mountainous Terrain -- are United States Army Light Infantry Divisions Preparing Properly?", (Ft. Leavenworth, Command and General Staff College, 1987), p.80.

35. Military Mountaineering Advisory Group, Position Statement, (National Association of the 10th Mountain Division, 1986), p.1.

36. Louis C. Peltier and G. Etzel Percy, Military Geography, (Princeton, D. Van Nostrand Company, Inc., 1984), p.118-119.

37. U.S. Army, FM 90-6. Mountain Operations, (Washington D.C., Department of the Army, 1980), pp.1-2 to 1-5.

38. John Keegan and Andrew Wheatcroft, Zones of Conflict. An Atlas of Future Wars, (New York, Simon and Schuster, 1986), p.20.

39. U.S. Army, FM 90-6 Mountain Operations, pp.1-1 thru 1-5.

40. Multiple citations:

A. Keegan and Wheatcroft, pp. 1-143.

B. A Merriam-Webster, Webster's New Geographical Dictionary, (1980).

C. Victor Showers, World Facts and Figures, (New York, John Wiley & Sons, 1979).

41. Edward N. Luttwak, "Strategic Utility of US Light Divisions, A Systematic Evaluation, Final Report", (Chevy Chase, TRADOC Contract, 1985), p.77.

42. Headquarters United States Army Training and Doctrine Command, "French Briefing on Mountain Troops", Typed Manuscript, (1983), pp.1-9.

43. Publication #840, Employment of the Alpine Brigade, Italian Ministry of Defense, (1975), part 1.

44. Headquarters Army Office V 3 (2), Die Gebirgsjagertruppe; Typed Manuscript, (1987).

45. Edward N. Luttwak, "Historical Analysis and Projection for Army 2000, Part 1, German Mountain Troops (pre-1945) [Draft]", (Chevy Chase, TRADOC Contract, 1982), p.i.

46. Peter MacDonald, "Gebirgsjagerbrigade 23," Special Forces Journal, nd, pp.50-56.

47. Headquarters Army Office V 3 (2), Die Gebirgsjagertruppe.
48. MacDonald, pp.50-56.
49. Edward N. Luttwak, "The United States Army of the Second World War: The Light Divisions", (Chevy Chase, TRADOC Contract, 1983), pp.ii, 26.
50. Gen Carl E. Vuono, Speaking With One Voice, White Paper, (Washington D.C. US Government Printing Office, 1988), p.1.
51. U.S. Army, EC 71-101. Light Infantry Division Operations, (Ft. Leavenworth, US Army Command and General Staff College, 1984), p. 1-2.
52. U.S. Army, EC 71-101. Light Infantry Division Operations, (Ft. Leavenworth, US Army Command and General Staff College, 1984), pp.1-4 to 1-7.
53. U.S. Army, FM 7-72. Light Infantry Battalion, (Washington D.C., Headquarters Department of the Army, 1987), pp.1-5 to 1-18.
54. Military Mountaineering Advisory Group, p.1.
55. State of Vermont, Office of the Adjutant General, Army National Guard Mountaineering School Program of Instruction, (Winooski, Vermont, State Printing Office, 1986) p.71.
56. Ibid., p.5.
57. Vermont Army National Guard, 3-172d Infantry (Mountain) Long Range Planning Calendar, (Jericho, Vermont, 1987).
58. U.S. Army, FM 100-5. Operations, (Washington D.C., Department of the Army, 1986), p.12.
59. Ibid.
60. U.S. Army, FM 7-72. Light Infantry Battalion, pp.1-6.
61. Edward N. Luttwak, Strategic Utility of US Light Infantry Divisions. A Systematic Evaluation, p.79.
62. U.S. Army, FM 100-5. Operations, pp.12-13.
63. Schmelzer, p.2.
64. CPT Michael Robertson, "Briefing on the Force Design of the Light Infantry Division," (Ft. Leavenworth, Force Design Directorate, CACDA, 1988).

65. George Santayana, The Life of Reason, (Vol 1, 1906).
66. Samuel B. Griffith, translator, The Art of War by Sun Tzu (New York, Oxford University Press, Inc., 1971), p.83.
67. LTC Marcus L. Powell, Jr. "Mountain Operations", Military Review (Ft. Leavenworth, US Army Command and General Staff College, Jan 1952), p.6.
68. Military Mountaineering Advisory Group, p.3.
69. Ibid., pp.1-3.

BIBLIOGRAPHY

A. Unpublished Dissertations, Theses, and Papers

Govan, Thomas P. "History of the 10th Light Division (Alpine)." AGF Historical Section Study No. 28). 1946.
Provides a sequential overview of the 10th Light Division (Alpine) to include a narrative on the Mt. Belvedere operation. Good source.

Luttwak, Edward N. "Historical Analysis and Projection for Army 2000. Part 1. German Mountain Troops (pre-1945)." Chevy Chase, MD, 1982.

Exceptional overview of the history, employment, training techniques and special operations of German Mountain troops.

_____. "Strategic Utility of US Light Divisions, A Systematic Evaluation." Chevy Chase, MD, 1985.
Provides an excellent strategic viewpoint on the employment of mountain units. It focuses on the theater strategy level deployment of two light infantry divisions into Iran.

_____. "The US Army 10th Mountain Division." Chevy Chase, MD: 1982.

Accurate account of the division's operations in Italy. Discusses the organization and weapons of the division and provides an assessment of the why it was successful in combat.

_____. "The US Army in the Second World War, The Light Divisions." Chevy Chase MD: 1983.

Discusses the reasons for and the organization of the different light divisions. The jungle, pack, and mountain divisions are discussed. The Hunter Liggett Maneuvers are reviewed which were the proving grounds for testing the units.

Richmond, Melvin E. "Combat Operations in Mountainous Terrain -- Are United States Army Light Infantry Divisions Preparing Properly?" Master of Military Art and Science Thesis, USACGSC, 1987.

Useful source for research materials and provides an overview of the use of the 10th Mountain Division. The thesis concludes that there is a need for training infantry in mountain operations.

Semadeni, Erhard. "Mountain Warfare in the European Alps: The Impact of Soviet Offensive Capabilities on Established Infantry Defensive Tactics." Master of Military Art and Science Thesis, USACGSC, 1981.

Provides information on employment considerations of mountain units in the Alps and discusses the Soviet viewpoint on mountain operations. A reader who is not knowledgeable on mountain warfare may find the source useful, I did not.

Gardner, Gregory C. "A Concept for the Tactical Employment of Light Infantry in Central Europe." School of Advanced Military Studies Monograph, USACGSC, 1986.

Good analysis of the use and misuse of light infantry forces since World War II and discusses the capabilities of the unit. It does not address terrain specific issues.

B. Books

Brown, John Sloan. Draftee Division. Lexington: The University Press of Kentucky, 1986.

Excellent book on the formation of the 88th Infantry Division and superb summary of its combat operations in Italy. This book will be referenced heavily in the thesis.

Burton, Hal. The Ski Troops. New York: Simon and Schuster, 1971.

Extremely useful source in providing names, dates, sequence of events pertaining to the formation of the 10th Mountain Division, it's training program, and action in Italy.

Clark, Mark W. Calculated Risk. New York: Harper & Row, 1950.

Provides overview of the campaign goals for the Italian peninsula and gives insight to the decisions made on employment of the armies.

Delaney, John P. The Blue Devils in Italy. Washington DC: Infantry Journal Press, 1947.

Key source on the 88th Infantry Division. Provides detailed explanations of the unit's activities from activation to occupation.

Ellis, John. Cassino. The Hollow Victory. New York: McGraw-Hill Book Company, 1984.

A few references about the 88th Infantry Division which did not prove worthwhile.

Esposito, V.J. The West Point Atlas of American Wars. Vol II. New York: Frederick A. Praeger, Publishers. 1959.
Links various campaigns and battles to operational maps. Provides description of terrain and conditions.

Fisher, Ernest F. Jr. Cassino to the Alps, United States Army in World War II: The Mediterranean Theater of Operations. Washington D.C.: Center for Military History, United States Army: 1977.

Invaluable source for factual material. It provides an excellent discussion on all the units involved and will be used extensively during the compare/contrast section on soldiers trained and untrained in mountain operations.

Forty, George. Fifth Army At War. New York: Scribner's Sons, 1980.

Is informative on the operations in general and has a detailed overview of the 10th Mountain Divisions operations.

Graham, Dominich. Cassino. New York: Ballantine Books Inc., 1970.

Contains two pages of problems in operating in a mountain environment ranging from use of mortars to soldier hygiene.

Griffith, Samuel B. (Translator). Sun Tzu. The Art of War. New York, Oxford University Press. 1971.

Used only for a quotation.

Hammerstein, Gay, and Sheridan, Richard G. The 88th Infantry Division in World War II: Factors Responsible for Its Excellence. Dunn Loring, Virginia, Historical Evaluation and Research Organization, 1982.

Excellent source on the organization, leadership, morale, and operations of the 88th Infantry Division.

Harper, Frank. Night Climb. the Story of the Skiing 10th. New York: Longmans, Green, & Company, 1946.

Glamorous source on the 10th Mountain Division battles. Other sources proved more factual. Valuable only for its insight into the struggles of the individual soldier.

Harpur, Brian. The Impossible Victory. New York: Hippocrene Books Inc., 1981.

Provides information on the battle for Italy. This source was not used.

Hauptman, Charles M. Combat History of the 10th Mountain Division. 1944-1945. no pub. 1977.

Factual listing of battle reports with actual narratives of the combat operations of the division. Useful for background reading.

Jackson, William G. F. The Battle for Italy. New York, Harper & Row, Publishers, Incorporated, 1967.

Offers extracts on the 10th Mountain Division and the 88th Infantry Division operations. Gives a good description of the environment and the problems and harsh realities of mountain warfare.

Keegan, John and Wheatcroft, Andrew. Zones of Conflict. An Atlas of Future Wars. New York, Simon and Schuster. 1986.

Excellent reference in determining possible trouble spots for future deployments of United States troops in mountainous regions.

Lucas, James. Alpine Elite. German Mountain Troops of World War II. New York: Jane's Publishing Inc., 1980.

Discusses the "Gebirgsjager" at war. The organization, tactics and equipment of the mountain troops are discussed. Provides the opposite view of the battle for Italy.

MacDonald, Charles B. The Mighty Endeavor. The American War in Europe. New York, First Quill Edition, 1986.

General overview of the decision to commit American troops to battle. Discusses the American involvement from Africa to the conquest of Germany. Did not use this source.

Webster's New Geographical Dictionary. Springfield, Massachusetts: G. & C. Merriam Company. 1980.

Useful in obtaining facts on specific mountains and regions throughout the world.

Pearcy, G. Etzel, and Peltier, Louis C. Military Geography. Princeton, New Jersey: D. Van Nostrand Company, Inc., 1966.

Presents an historical overview of operations in the mountains. Identifies the different types of terrain and climatic effects on mountain operations. Excellent source.

Rommel, Erwin. Attacks. Vienna, Virginia: Athena Press, Inc., 1979. (reprint).

Useful information on the employment of mountain troops and provides insight on why mountain troops are better trained soldiers.

Santayana, George. The Life of Reason. Vol 1. 1906.
Used only for quote.

Schepe, Gerhard. Mountain Warfare in Europe. Kingston,
Canada: Queen's University, 1983.
Discusses theory and the constitutive factors of
mountain warfare. Examines the regional aspects of
Europe and helicopters in mountain warfare.

Showers, Victor. World Facts and Figures. New York: John
Wiley & Sons. 1979.
Provides facts on elevations of the highest
mountains by continent. Used during discussion on
possible deployment areas for the United States.

Starr, Chester G. From Salerno to the Alps. Washington
DC: Infantry Journal Press, 1948.
Gives a detailed overview of Fifth Army operations,
1943-1945. The book focuses on the staffs and the men who
fought the battles. It shows the decisions, good and
bad, and how the Fifth won the Italian campaign.

Truscott, L.D., Jr. Command Missions. New York: E.P. Dutton
and Company, Inc., 1954.
Discusses the army missions in the Italian theater
and gives personal accounts of the combat operations by
Lt. General Truscott, Jr.

C. Newspapers and Magazines

DePuy, William E. "The Light Infantry: Indispensable Element
of a Balanced Force." Army, June 1985, pp.26-41.
Provides insight in the deployment of light infantry
soldiers in a mountain environment. Asserts that the
101st Air Assault Division is a perfect mountain
division with its antiarmor capability and mobility.

Harper, Gene. "Of Men and Mountains." Soldiers, August
1985, Vol 40, Issue 8, pp. 44-46.
Useful article - gives background on the formation
of the 10th Mountain Division before WW II by Minnie
Dole. States that reports from Italy indicate that the
standard infantry divisions could adapt to mountain duty.
Provides an overview of training of the mountain troops.

Heasley, Morgan B. "Mountain Operations in Winter."
Military Review, June 1952, Vol.32, No.3, pp. 151-157.
States that tactical principles are the same but
application is different in the mountains. Provides a
good example of a regular infantry unit in Korea
conducting operations in the mountains. The article

indicates that there is not a need for specialized mountain units.

Jackman, Albert H. "The Tenth Mountain Division." The American Alpine Journal, 1946, Special War Number, pp. 187-192.

Only useful for one paragraph reference the 10th Mountain Division's ability to operate in a desert environment and the adjustments to training.

Muller, Edwin. "Our Fighting Mountaineers." The Reader's Digest, October 1942, Vol 41, No. 246, pp.73-76.

Introduction is the only useful part of the article. It highlights German and other allied mountain unit's employment. It brings out some of the problems encountered in the mountains.

Oliver, Norman J. "Ethan's New Green Mountain Boys." Soldiers, February 1987, pp. 37-40.

Good article on the formation of the Army National Guard Mountain Warfare School and the 3-172d Infantry (Mountain) Battalion. Discusses some of the training necessary for mountain troops.

Powell, Marcus L. "Mountain Operations." Military Review, January 1952, Vol 31, No.10, pp. 143-149.

Contains analysis on how application of standard tactical principles differ in mountainous terrain. Identifies the characteristics of mountain warfare. Good article. Depicts differences through use of operation overlays.

Scammell, Joseph M. "On Mountain Warfare." Infantry Journal, January 1941, Vol. 35, No. 1, pp.26-28.

Discusses the extreme differences between conventional warfare and mountain warfare. States that the leadership is negligent if it does not concentrate on training soldiers for combat in the mountains. The article says that current forces are not organized, equipped or trained to win in the mountains.

Scharfen, John C. "Cold Weather Training: The Absolute Necessity." Marine Corps Gazette, February 1981, Vol., No. pp.108-15.

Article is not useful for this study. Discusses the employment and scenarios of the Marines in Norway.

Thompson, Will. "Mountain Troops Again After Forty Years." Blizzard, 2d Qtr 1985, n.p.

Good historical overview of mountainous terrain throughout the world. Does not support the forming of mountain infantry units similar to the WW II 10th

Mountain Division due to the advent of the helicopter and the need for independent operations. Good article for use as a different perspective and for the terrain discussion.

D. Government Publications

Headquarters, US Fifth Army. Lessons Learned from the Italian Campaign. Tng Memo # 3. Italy. 1944.

Extensively used for resource material and insight into the hard lessons that were learned by the commanders and staff of the Fifth Army.

Headquarters, 88th Infantry Division. We Were There from Gruber to the Brenner Pass. Information and Education Section, MTOUSA. 1945.

Fine source on the 88th Division. Gives an overview of all the combat operations highlighting individual soldier actions. Useful in describing the battles of Mt. Capullo and Mt. Battaglia.

Headquarters Army Ground Forces. Report on Mountain Warfare. Washington D.C.: Army War College. By John Schmelzer. 1944.

One of the best sources found. Provides keen insight into the struggles of the units in Italy as they fought the environment and the Germans.

Headquarters European Command. Report on Tactical Principles of Mountain Warfare. Germany: Office of the Chief Historian. 1947.

Picks out the key factors affecting mountain warfare and gives combat examples of each principle described.

State of Vermont, Office of the Adjutant General. Army National Guard Mountaineering School Program of Instruction. May 5, 1986.

Provides detailed information on the training program of the Army National Guard Mountain Warfare School. Very useful in identifying what it takes to train mountain troops.

US Army. 351st Infantry Regiment History. US Army Military History Institute, July 1945.

Excellent source on the conduct of individual battles. Gives details and a soldier's perspective of the fighting.

US Army. FC 7-12. The Infantry Company Fighting in Mountains. Fort Benning, Georgia, June 1985.

Provides the Ft. Benning perspective on how a conventional infantry force applies the tenets of airland battle in mountainous terrain. It is useful for comparing the viewpoints of the two schools of thought on whether there is a need for specialized mountain units.

US Army. FC 71-101. Light Infantry Division Operations. Fort Leavenworth, Kansas, 31 July 1984.

Explains the mission, organization, capabilities and limitations of the light infantry division. Very useful in the compare/contrast between the other mountain units.

US Army. FM 7-72. Light Infantry Battalion. Washington, DC: Department of the Army, March 1987.

Explains the mission, organization, capabilities and limitations of the light infantry battalion. Very useful in the compare/contrast between the other mountain units.

US Army. FM 90-6. Mountain Operations. Washington, DC: Department of the Army, 30 June 1980.

Not very specific in employment of mountain units. Provides general principles and states common sense fundamentals.

US Army. FM 100-5. Operations. Washington, DC: Department of the Army, 5 May 1986. pp 82-83.

Discusses the operational overview of employment of light forces in mountainous regions. Highlights the influence of terrain on employment of weapons, mobility, and the compartmented nature of mountain operations. Good "big picture" perspective.

US Army. TC 90-6-1. Military Mountaineering. Washington DC: Department of the Army, 30 September 1976.

Too technical. Does provide scenarios for employment of mountain units and discusses some of the training requirements.

US War Department. German Winter Warfare. Special Series #18. Santa Monica, Ca.: HISTORICA, 1983.

Focuses on adapting to winter conditions in Russia. It discusses general conditions in winter, marches, roads and all aspects of operating in a winter environment.

US War Department. German Mountain Warfare. Special Series #21. Washington D.C.: Military Intelligence Division, 29 February 1944.

German doctrine and training is presented and brings out the peculiarities of operating in the mountains.

E. Letters and Briefings

Headquarters, United States Army Training and Doctrine Command. "Briefing on French Mountain Troops." 1983.

Single source used for discussion on the mission, organization, employment and history of the French 27th Mountain Division.

Military Advisory Group. "Position Statement". National Association of the 10th Mountain Division. 1986

Superb source from the few remaining soldiers who have fought in the mountains. Outlines why the United States needs mountain infantry.

Vuono, Carl E. "Speaking with One Voice". White Paper. Washington D.C. 1988.

Provides the purpose for the formation of the U.S. light infantry divisions. Discusses the deployment, employment and mission of the light forces.

INITIAL DISTRIBUTION LIST

1. Combined Arms Research Library
U. S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027
2. Defense Technical Information Center
Cameron Station
Alexandria, Virginia 22314
3. Dr. C. R. Gabel
CSI
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027
4. Major A. W. Bremer, Jr.
CSI
U. S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027
5. LTC D. P. Wood
DSRO
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027